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**Fosse Way.** Early English name for an ancient Roman highway from Axminster to Lincoln. No part of its 182 m. deviates more than 6 m. from a straight line between these places. It runs through Bath, Cirencester, High Cross, and Leicester. It was one of the four royal roads on which, according to the laws of Edward the Confessor, the safety of travellers was the particular concern of the king.

**Fossil** (Lat. *fossilis*, dug up). Organic remains whether plant or animal, or direct evidence of their existence, preserved in any formation of the earth's crust, whether hard rock or superficial deposit. Fossils are not necessarily of great antiquity; bones of a sheep buried under recent flood deposits, as well as ancient organic remains, have been considered fossils. The term also includes the tracks of animals preserved in strata, and other markings or impressions made by living creatures.

Fossilisation is the process of burial and subsequent preserva-

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preserved to those lost is very small. Few organisms remain buried for long without undergoing some chemical change; e.g. vegetable remains lose their volatile constituents, and a part of their carbon content remains as a thin film. The frozen mammoths of Siberia, with flesh and hair intact, are examples of preservation in an almost unchanged condition. Outlines of soft parts are sometimes preserved, like the impressions of wings of pterodactyls (winged reptiles) found in Bavaria; but hard parts such as shells, bones, and teeth are the most likely parts to be preserved.

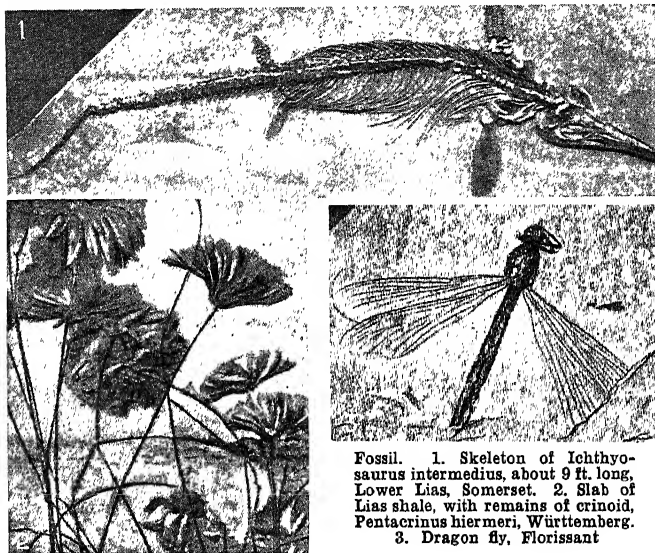
will occur in reversed relief, on which muscle impressions, etc., may be preserved.

Fossils have been known to exist in rocks since ancient times, but were first thought to be merely freak imitations of living forms. The identification of detailed structures in corresponding living and fossil forms led to the adoption of the view that they were relics of organisms once alive. The discovery of fossils in rocks far above sea level led the early Greek philosophers to invoke encroachments of the sea upon the land as an explanation. William Smith (the "father of English geology," 1769-1834) discovered that each member of a stratified series of rocks contained a definite assemblage of fossils, and that the same strata were always found in the same order of superposition. The essential value of fossils therefore is that they serve to distinguish individual horizons in a rock sequence.

For a long time all organic remains in rocks were attributed to the Noachian deluge, or to several such deluges, with successive special creations. But the great variety of fossils and their gradual progression from the earliest deposits to the present day gave the death-blow to this cataclysmal hypothesis, and led Darwin to propound his theory of evolution in 1859. Every plant and animal is found to possess a complicated history going far back into geological time, and the general succession of forms is consistent with slow evolution from simple to complex.

This evolutionary concept put new zest into palaeontology, the study of fossils, and led to stratigraphy, the study of strata—detailed investigation of range, distribution, and lines of descent of fossil communities.

**Fossembrone.** City of Italy, in the prov. of Pesaro. The ancient Forum Sempronii, it stands on the Metauro 10 m. E.S.E. of Urbino. It has a castle and a cathedral rebuilt in the 18th century. There are silk factories and mineral springs. Ruins of the Roman city, destroyed by the Goths and Lombards, lie about 2 m. N.E. of the town, which had a bishop in the 6th century. In the Second Great War Fossembrone was overrun by the Allied 8th army in late Aug., 1944; churches and secular buildings had suffered a certain amount of damage from shelling; and the Germans blew up three bridges. Pop. (1951) 11,203.



Fossil. 1. Skeleton of *Ichthyosaurus intermedius*, about 9 ft. long, Lower Lias, Somerset. 2. Slab of Lias shale, with remains of crinoid, *Pentacrinus hiermeri*, Württemberg. 3. Dragon fly, Florissant

tion. The ultimate mode of occurrence of the fossil depends on such factors as the nature of the organism, its habitat and mode of life, the time and mode of burial, and events subsequent to its entombment. Fossilisation is achieved either by the checking of decomposition or by the replacement of the hard parts of the body (bones, shell, etc.) by some relatively more durable substance; and it appears to be a lucky accident: the proportion of forms

Buried hard parts generally undergo petrification, i.e. solution of the original substance and its gradual replacement by mineral matter. Sometimes perfect details are preserved. Frequently the animal or plant is dissolved away and a cavity or mould is left in the enclosing rock. If the cavity is filled by infiltration of mineral matter a cast results. A hollow body such as a shell may become filled with material and, after solution of the shell, an internal mould

**Foster.** Name of a family of English cricketers. The sons of the Rev. Henry Foster, a master at Malvern College, they were there educated. Their names were H. K. Foster, Capt. W. L. Foster, D.S.O., who won this honour in Somaliland, R. E. Foster, B. S. Foster, G. N. Foster, and M. J. A. Foster. All played for Malvern and Worcestershire, which was sometimes called on this account Fostershire. H. K. (1873-1950), R. E., and G. N. Foster gained their blues at Oxford.

Reginald (1878-1914) was the finest batsman and fieldsman of the brothers. At Lord's in 1900 he scored a century in each innings for the Gentlemen against the Players, and at Sydney in Dec., 1903, he scored 287 against Australia, a record for a test match until 1930. He died May 13, 1914. Basil (b. 1882) gained distinction as an actor and theatrical manager, specialising in comedy. Frank R. Foster (b. 1889), a great all-rounder who played cricket for England and captained Warwickshire, was no relation.

**Foster, JOHN** (1770-1843). British essayist. Born near Halifax, Sept. 17, 1770, the son of a yeoman weaver, he spent his early years at the loom. At 17 he joined the Baptists, and, after study at Brierly Hall and the Baptist College at Bristol, he took a pastorate at Newcastle-on-Tyne, 1792. In 1805 appeared his *Essays*, by which he is chiefly remembered. These, particularly that *On Decision of Character*, are distinguished by imagination, depth, eloquence, and sincerity. He died at Stapleton, near Bristol, Oct. 15, 1843.



John Foster,  
British essayist

**Foster, MYLES BIRKET** (1825-99). British artist. Born at North Shields, Feb. 4, 1825, of Quaker parentage, he studied under Ebenezer Landells, wood engraver, for whom he drew many illustrations on the blocks. Starting in his own



M. Birket Foster,  
British artist

account in 1846, he illustrated in black and white many poetical publications, and in 1859 turned to water-colour, painting

especially idyllic landscapes in Surrey and other home counties. He became associate of the Royal Water Colour Society in 1860 and member in 1861. He died at Weybridge, March 27, 1899.

**Foster, STEPHEN COLLINS** (1826-64). American song writer. Born near Pittsburgh, July 4, 1826, he was chiefly self-taught as a musician. He graduated at Jefferson College, and from 1842 produced sentimental but memorable songs, mostly based on negro subjects and with words in negro dialect. These included *The Old Folks at Home*, *My Old Kentucky Home*, *Massa's in de Cold, Cold Ground*, *Old Black Joe*. The melodies are usually ascribed to Foster, but probably the words were adapted to suit the minstrel companies who first sang his songs. He died in New York, Jan. 13, 1864. Memoirs were published by his brother, Morison Foster, 1896, and H. V. Milligan, 1920.

**Fosterage.** Term used for the nursing and bringing-up of children by others than their parents. The custom prevailed in ancient Ireland, where the ties of fosterage were almost as close as those of blood relationship. Fosterage was undertaken either for payment or from affection, and lasted until the age of 13 for girls and 17 for boys. Apparently the mother paid for the fosterage of the boys and the father for that of the girls. A child was obliged to provide for the foster-parent in old age. See *Family*; *Kinship*.

**Fotheringhay.** A parish and village of Northamptonshire, England. It stands on the Nene, 4 m. N.E. of Oundle. Few traces remain of its 11th century castle, famous as the scene of the imprisonment, trial, and execution of Mary Queen of Scots in 1587, and as the birthplace of Richard III in 1452. Pop. 213.

**Foucault, LÉON** (1819-68). French physicist. Born Sept. 18, 1819, and educated privately, he became physicist to the Paris Observatory, where he constructed various instruments, of which the gyroscope and the polariser which bear his name were the most notable. He determined the relative velocities of light in air, in water, and in a vacuum and the existence of eddy currents in conductors in electro-magnetic fields; but is best remembered by "Foucault's pendulum." From the roof of the Panthéon in Paris he hung a pendulum 200 ft. long, free to oscillate in any direction. The pendulum never retraced its path,

but always deviated to the right, showing that the floor was moving and the earth rotating. Foucault died in Paris, Feb. 11, 1868. *Protn. Foo-co.*

**Foucault Currents.** Currents induced in solid iron cores by alternating current passing through coils wound thereon, and also by rotation in a magnetic field. See *Electricity*; *Magnetism*.

**Fouché, JOSEPH** (1759-1820). A French politician. Born near Nantes, May 21, 1759, he was educated by the Oratorians in Paris. Ordained priest, he became a teacher and rose to be principal of Nantes College in 1780. Throwing in his lot with the Revolution,



Joseph Fouché,  
French politician

he sat in the National Convention (1792), became a Jacobin, and vehemently advocated the execution of Louis XVI. Having renounced his orders, he was the moving spirit in the mummeries of the worship of reason and the spoliation of the churches.

Instrumental in the fall of Robespierre, 1794, Fouché became minister of police in 1799. Under Napoleon he retained this position, was raised to the senate, and, under the empire, was also minister of the interior. He was made duke of Otranto in 1808 and governor of Illyria in 1813. After Leipzig, seeing that Napoleon's power was on the wane, he prepared to desert to the Bourbons, under whom, after 1815, he again became minister of police. But he was exiled as a regicide in 1816, and died in Trieste, Dec. 25, 1820. It was Fouché who said of the murder of the duc d'Enghien, "It was worse than a crime; it was a blunder." *Consult Life, S. Zweig, Eng. trans. 1930.*

**Fougasse (Fr.).** Military mine originally placed under the glacis or ditch of a fortress. It is sometimes used to defend a defile or other approach by throwing a shower of stones upon the enemy. An excavation is made, the axis of which is inclined at an angle of about 40° to the horizon; it is about 4 ft. deep, in the form of a frustum of a cone, 5½ ft. at the surface. In a recess at the bottom is placed a square box of gunpowder, inclined to the horizon at 40°, and on the box a wooden shield about 6 ins. thick. The excavation is filled up with stones, the excavated

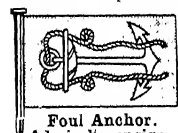
earth being placed in a mound in a line with the powder box to increase the resistance upwards, and so ensure the effect of the explosion upon the stones at the required angle; the fuse is led up from the box over the mound. The modern fougasse discharges burning oil, and the hedgehog fougasse can be concealed behind a wall or rise, over which it will jump on being fired.

**Fougasse.** Pseudonym of the humorous artist C. K. Bird (*q.v.*).

**Fougères.** Town of Brittany, France. It stands on the Nançon, in the dept. of Ille et Vilaine, 30 m. N.E. of Rennes. The chief buildings are the churches of S. Sulpice and S. Leonard, both of the 15th century, while there are remains of the castle and other fortifications built to protect the town in the Middle Ages. The castle, standing on a rock, was partially restored in the 20th century. Its eleven battlemented towers give an idea of its original size and strength. The hôtel de ville dates from the 15th century, and there are some old houses. The town is now a market for agricultural produce and a centre of tanning and other industries connected with the manufacture of boots and shoes. Granite is found in the vicinity. Fougères was long one of the strong places of Brittany, and was taken by the English in 1166 and 1448. In the Second Great War it was liberated by American armoured forces, Aug. 5, 1944. Pop. 19,281.

**Foula.** One of the Shetland Islands, Scotland. It lies 16 m. to the S.W. of the mainland, and is frequented by sea-fowl, the skua breeding here. It is a thriving fishing centre. Its length is  $3\frac{1}{2}$  m., breadth  $2\frac{1}{2}$  m., and highest point 1,370 ft.

**Foul Anchor.** Nautical term used to describe an anchor having one or both flukes entangled in the chain or rope. This is the device



Foul Anchor.  
Admiralty ensign

**Foulard** (Fr.). Soft, thin, flexible fabric made of silk or silk and cotton, usually printed in colours on a light or dark ground, or having a white spot on a dark coloured ground.

The name was formerly applied to a gauze ribbon material manufactured in France.

**Foulis, ROBERT** (1707-76). Scottish printer. He was founder of the Foulis Press and was born at Glas-



Robert Foulis,  
Scottish publisher  
From a medallion by  
J. Tassie

gow, April 20, 1707. While a barber's apprentice he attended the university lectures of Francis Hutcheson, on whose advice he started business as a printer and bookseller in 1741. Two years later he was appointed printer to Glasgow university, and in 1744 took his brother Andrew (1712-76) into partnership. After the death of the two brothers the business was continued by Robert's son, Andrew (d. 1829).

The Foulis Press issued more than 550 vols., reprints of Greek, Latin, and British classics, remarkable for beauty of type, format, and textual accuracy. They included the "immaculate" Horace, 1744; the fine Homer, in four folio vols., 1756-58; a folio edition of Paradise Lost; and the poems of Gray and Pope. A collection of Foulis books is in the Mitchell Library, Glasgow. *Pron.* Fowls.

**Foulness.** Island and village of Essex, England. The island lies at the mouth of the Crouch, 7 m. N.E. of Shoeburyness, and is 5 m. in length by  $2\frac{1}{2}$  m. in breadth. Although protected from the sea by a dyke, it was flooded 10 ft. deep during the great tide of Jan. 31-Feb. 1, 1953; eight people were killed. The village church built in 1850 replaced a wooden structure. A replica of Hitler's Atlantic Wall was built on the island in 1943 and bombarded experimentally; from the results were devised the close-support weapons that breached the Atlantic Wall in France in June, 1944. Pop. (1951) 371.

**Foumart.** Contraction of foul marten, old name for the polecat.

**Foundation** (Lat. *fundare*, to lay the bottom of, found). Literally, the base of a building, or that upon which a structure rests. It is freely used for a society, such as a college or school, hospital or monastery, which is endowed, and so founded or set up on a permanent basis. The money given for this purpose and the conditions for which the society exists are the foundation, the work of the founder.

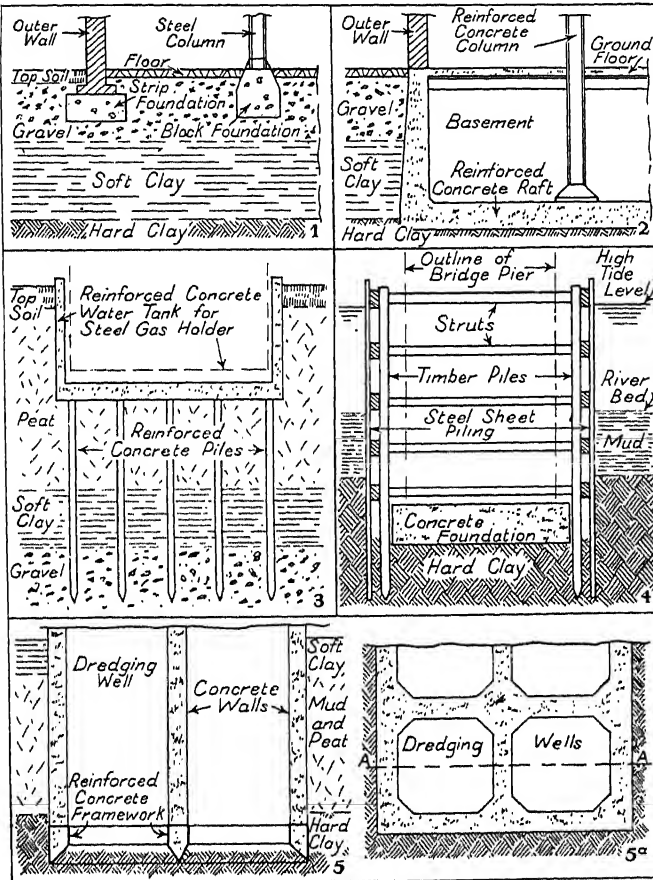
Those on the foundation of a college at Oxford or Cambridge, or of a school such as Winchester and Eton, are those scholars and others who receive money from the college funds, under the conditions laid down by the statutes. Permanent charities, such as an alms-

house or a hospital, are also known as foundations, as are cathedrals. The chapters of the English cathedrals are divided into old foundations and new foundations. The former are those which were unchanged at the Reformation; the latter those which, being then composed of monks, were provided with new chapters. *See* Cathedral.

**Foundation.** That part of a building, bridge, or other structure which transfers the weight of the structure and the loadings imposed on it to the subsoil. The types of structures, the loadings thereon, and the types of subsoil on which structures can be built are widely variable, and the selection and design of suitable foundations requires the combination of theoretical and practical knowledge of construction with skill in design.

Subsoils include stiff river weed; waterlogged peat bogs; soft, medium, and stiff clays; running sand; moist or dry sand or gravel; chalk which may be as soft as mud or as hard as soft rock; and solid rock. Increasing knowledge of the strength and behaviour of these materials under load resulted in a new science of soil mechanics, the exponent of which was Prof. Karl Terzaghi. By using methods which he originated, it became possible to explain previously inexplicable failures, and to design foundations in difficult soils more economically and with a greater degree of confidence than formerly. These methods involve a thorough exploration of the subsoil by boreholes. Samples of the subsoil are taken at various depths and their strength is determined by laboratory methods. Clays are particularly troublesome; because of slow changes under load they may eventually fail after carrying the load of the structure safely for 100 years. The old Waterloo Bridge across the Thames failed partly for this reason.

**SHALLOW FOUNDATIONS.** Where the structure load per sq. ft. of foundation is small, as in houses, factories, and other buildings not more than four storeys high on good subsoil, shallow foundations, usually with strips and blocks of concrete under the walls and columns, are adopted. Failure may occur if there is a weak subsoil close below the foundations, as in Fig. 1. Other causes of failure are frost-heaving of silts and silty sands in winter, and shrinkage of clays in summer. Where strip and block foundations involve loading the subsoil too heavily, a concrete raft or a concrete box forming a



Foundation. Details of typical foundations. 1. Factory foundations on poor soil, liable to settle. 2. Reinforced concrete basement foundation. 3. Typical foundation supported on reinforced concrete piles. 4. Bridge foundation built in sheet piled cofferdam. 5. Reinforced concrete monolith foundation; showing section marked AA in 5a, which is a part sectional plan of the same foundation

basement to the building will spread the load (Fig. 2).

**PILED FOUNDATIONS.** If the upper subsoils are too weak to carry the structure loads, groups of piles founded at lower levels may be used (Fig. 3); but it is necessary to determine whether the lower subsoil can safely carry the ground above it as well as the structure load. Piles may be driven or formed in place.

**DEEP FOUNDATIONS IN COFFERDAMS.** Where the load per sq. ft. is high, and a suitable subsoil can be reached at a moderate depth, bridge piers in larger rivers and quay walls are frequently founded on large blocks of concrete formed in cofferdams. Sheet piling is driven to form a square or rectangle, and is then strutted with timber or steel (Fig. 4). The part of the piling in the clay forms a "cut-off" wall which prevents the water from percolating into the coffer-

dam, and the foundation is built under dry conditions after the water has been pumped out. This method was used for the second permanent Waterloo Bridge.

**WELLS AND CYLINDERS.** Where the load is not so heavy, or where the foundation is to be formed on land rather than through water and the upper subsoils are weak, well or cylinder foundations may be used. A framework of timber, steel work, or reinforced concrete is formed on the site of the foundation and walls of brickwork or concrete are built above it. The material inside the well is excavated, and the well structure sinks into the subsoil. Further walling is added and the process is repeated. Concrete or pig-iron may be piled on top of the walling to assist the well to sink to the correct level. When a suitable subsoil has been reached the well is pumped dry and filled with con-

crete. If it is desired to sink a cylinder foundation under "dry" conditions, and the ground water pressure is such that this cannot be done by ordinary means, air locks are fitted to the top of the cylinder and air is forced in under pressure to keep the water out, as in the diving bell. Men and materials enter the cylinder through the air lock, and when the outer door is shut the air pressure is increased to that inside the cylinder.

**MONOLITH FOUNDATIONS.** Monoliths are similar in structure to cylinder foundations, but are larger and usually square or rectangular. They are subdivided by two or more cross walls into a number of "wells" (Fig. 5) and sinking of the monolith is controlled by "grabbing" from the wells as necessary. The main towers of the recently completed Howrah Bridge, Calcutta—which was begun before the Second Great War and opened to traffic in 1943, and is a double cantilever steel structure of 1,500 ft. clear span—are founded on monoliths sunk over 100 ft. through soft clay and silt to hard clay. The monoliths are the largest and deepest ever used under similar conditions. Concrete floors were formed at foundation level, and the walls were left unfilled to reduce the weight on the clay. Reinforced concrete roofs were raised over the wells at ground level, and on these the bridge towers were successfully built.

**Foundation Day.** Public holiday observed in Australia on Jan. 26. It commemorates the anniversary of the first British settlement in Australia, when Capt. Arthur Phillip landed a party of convicts and marines on the shores of Sydney Cove, Port Jackson, New South Wales, Jan. 26, 1788.

**Foundation Garment.** Name given to a feminine garment designed to support the body without the help of whale-bone or steel. The first garments of this kind were introduced in the 1890s and were of bodice type, giving support by the skill of their cut, by stitching, and by the use of two or more thicknesses of material at points of strain. The foundation garment did not achieve wide popularity, however, until the invention of a fine elastic yarn in 1930 made it possible to weave a firm yet yielding material with a two-way stretch, which was used wholly or in part to make pull-on and roll-on girdles and corsettes. With a girdle, which normally



reached little above the waist, a separate brassiere was usually worn; this garment, designed to protect and support the bust as well as, where necessary, to improve its appearance, came into vogue after the high, rigid corset of the early years of the 20th century went out of fashion.

**Foundation Sacrifices.** Ritual immolation at the foundation of a building or settlement with the object of strengthening or guarding it. Human skeletons are found beneath cornerstones in early Palestine, as at Gezer and Megiddo. When Mandalay was built, 1860, 52 human victims were buried alive. Legends of living burial are recorded of S. Columba's Cathedral, Iona; S. Patrick's monastery, Clonmacnoise. Animal bones were unearthed beneath old S. Paul's and Blackfriars Bridge, London. The Scandinavian kirk-grim was the spirit of the foundation victim. Animal slaughter as a foundation rite survives from W. Africa through Coptic Egypt and Muslim Syria to Borneo. The same purpose was served by interment of statues in ancient Rome, of effigies in medieval Europe; and by shadow burial lasting into the 20th century in S.E. Europe.

**Founder.** A disease affecting horses, cattle, sheep, and pigs. Known in veterinary science as laminitis, it is a painful inflammation of the laminae, or tissues connecting the hoof with the bones of the foot. It is caused by bad management and careless feeding, horses that have much corn and little exercise being apt to develop it suddenly. Indian corn, beans, peas, and barley undoubtedly predispose to this form of fever. In mares it may follow foaling. Treatment consists in a moderately strong purge and blood-letting, and frequent warm bran poultices. The animal may be slung, in order to take its weight off its feet, and if the pain is severe cocaine may be given.

**Founders' Company, THE.** London city livery company, to which ordinances were granted



Founders' Company arms

July 29, 1365. It was formed to ensure that work by founders in the city of London should be only with good metal. It was granted its present charter Sept. 18, 1614. The company has the power to size and stamp

brass weights in the City and 3 miles around. It endows fellowships to attract suitable young men to the founding industry. The hall is at 13, St. Swithin's Lane, E.C.; the former hall, still owned by the company, is in Lothbury and is occupied by Brown Shipley & Co., bankers.

**Founder's Share.** Class of share granted to the originators of a joint stock company, or to others who have rendered services to it. They are usually few in number and for small amounts, 1s. perhaps; but sometimes they become valuable because they participate in the profits after a certain fixed amount has been reached. The fact that their total amount is small enables a successful business to pay an enormous percentage on such shares. This class of share is rarely issued now, and in some concerns those issued earlier have been bought out and cancelled. See Company Law.

**Foundling Hospital.** Charitable institution founded to prevent the murder or exposure of newly born children. Such institutions appear to have been coincident with the development of civilized society, and they undertake the education and training of children until the latter reach maturity. The first step towards avoiding the crime of child murder was the exposure or abandonment of an infant in a public place in the hope that it would be found (hence foundling) and cared for by someone other than the parents. The earliest recorded case of exposure seems to be that of Moses (Exodus 2). Foundlings thus exposed were assigned as property to those who took them under their protection, and provision was made in ancient Greece and Rome for the upbringing of unadopted infants at the expense of the state, an example followed by the French in 1790.

At Trèves cathedral, in the 6th century, foundlings were received and arrangements made for their care under the supervision of the archbishop. The first foundling hospital of which there is authentic record was at Milan towards the end of the 8th century. The Order of the Holy Ghost, founded at Montpellier in the 12th century, made the care of foundlings a special duty. The Spedale degli Innocenti, or Foundling Hospital, at Florence, dates from 1419-51. The Ospedale di S. Spirito, in Rome, founded by Innocent III, included a foundling institution. In 1536 Marguerite of Valois instituted a foundling hospital which was incor-

porated with the great Foundling Hospital in Paris, started in 1670. Foundling hospitals now exist in all the great capitals of the world, though the word foundling does not correctly describe them all.

One of the most interesting of such institutions was that in London. Its founder, Thomas Coram (1668-1751), a captain in the merchant service, and a man of comparatively humble means, advocated his project for nearly 20 years before it was realized, and a house in Hatton Garden was opened in 1741 for 20 infants. The later building in Lamb's Conduit Fields (later Guilford Street, St. Pancras) dated from 1745, when it had 600 inmates, supported at an expenditure of five times the income. Parliament voted a grant of £10,000, but stipulated for indiscriminate admittance, which had to be abandoned. From 1760 entry was limited to illegitimate children who had been deserted by the father, but whose mothers could prove previous good character. Hogarth, one of the earliest governors, began an art exhibition in its rooms which led to the foundation of the annual exhibitions of the Royal Academy. Handel also was a tireless benefactor.

The St. Pancras site was sold in 1926; and in 1935 the institution, as the Thomas Coram schools, moved to Berkhamsted. In 1951, as Ashlyns, it became a co. secondary school, with 200 boarders.

**Foundry** (Lat. *fundere*, to pour, melt). Term properly referring to the art of casting molten metals into moulds; but more generally used for a building in which metals are founded. Metals have been melted and cast into moulds for over 5,000 years, and many examples of ancient Chinese, Japanese, and Roman castings may be seen in the museums of the world. From them may be obtained an idea of the growth of the art from single castings to modern castings weighing 100 tons or more and mass-produced articles weighing a fraction of an ounce. There are three main classes of foundry: ferrous (cast iron and steel); heavy non-ferrous (such as brass and bronze); and light metals (magnesium and aluminium alloys). But the methods used and principles applied are similar in all.

Essentially founding consists of making some form of patterned hole in sand and filling that hole with molten metal. When the metal cools it freezes, forming a solid replica of the shaped hole

Further cooling causes contraction of the solid metal, so that the finished casting is slightly smaller than the hole; but otherwise the metal will have taken up the contours of the sand mould, which is then broken away from the casting. Engineers, metallurgists, physicists, chemists, and ceramists help to control and improve the processes, while melters, annealers, pattern- and core-makers are needed in every foundry.

The first item required before founding is a pattern of the same shape as the casting desired. This is prepared from a drawing of the component and may be made of wood, brass, cast iron, or white metal. Moulding technique must also be borne in mind, as the pattern has subsequently to be extracted from the sand without disturbing it. Yellow pine and mahogany are commonly used for wooden patterns. Cast iron is the most common metal used, though its weight sometimes makes it difficult to handle. Plaster of Paris is often used for small castings and for core patterns. Cores are those parts of the mould which must be made in separate sand shapes and assembled in the mould to produce hollows and undercut portions in the casting. Special sands make the moulds, and a great deal of experimental work has been carried out on them.

#### How to Make a Mould

The mould is made in several stages. A suitable moulding box is selected, and the top half is placed on a bench and filled with sand. The pattern is then pressed halfway into the sand, forming a temporary support for the bottom half, which is now placed on top and filled with sand. The boxes are then turned over and the temporary part is removed. The joint is covered with sand which contains no bonding agent, to prevent the two halves from sticking together. The procedure is repeated by putting the top half, or cope, on top and filling. The two halves may then be separated and the pattern removed. Feeders must then be formed to allow the metal to be poured in.

More complicated castings may need several mould boxes, with vents to hold the core in position when a hollow casting is to be made. When a core is used some outlet must be left, not only for the gases, but also for the core itself to be removed subsequently. Very large castings require pits and special structures; often loam, which contains more clay than

normal sands, is used for this work. A large casting may take several weeks to cool. For mass production most of the work of mould manufacture is carried out mechanically.

Furnaces used in foundries vary with the type of material being handled. They range from the huge open hearth and electric arc furnaces used for steel and the cupola for cast iron to the small electric induction and oil-fired furnaces of the non-ferrous industry. Techniques for handling the molten metal differ. Pipe castings are made in large quantities by centrifugal casting, in which the molten metal is thrown to the periphery of the mould by its own centrifugal momentum and solidifies there in an even layer. Die-casting employs metal moulds, which lend themselves to mass production. In general, cast metals are harder and more brittle than those that have been worked, but this result is often altered by heat treatment. *See Casting; Furnace.*

**Fount.** In printing, a term for a supply of type of one size and face, with a distinctive nick. The quantity is ordered according to the number of compositors employed and the class of work for which it is required. For newspapers, an extra quantity of capitals and figures is necessary. With this proviso, a fount will contain a standard number of all the letters of the alphabet, graded in bulk according to the occurrence of the letters in the language in which the type is cast. In the U.S.A. the word is spelt font. *See Printing; Typefounding.*

**Fountain** (late Lat. *fontana*). Term applied to any construction for the supply of water, from a simple spring to an elaborate artificial basin with ornamental jets. The need of fountains was experienced in Oriental countries at a very early date. Traces of their employment have been found among the relics of the Chaldaean civilization; Pausanias mentions Hellenistic examples; and in ancient Rome they were fully developed as a means of distributing the water brought to the city by the aqueducts. Pliny the Elder notes the construction or repairing of more than 1,200 fountains in Rome alone.

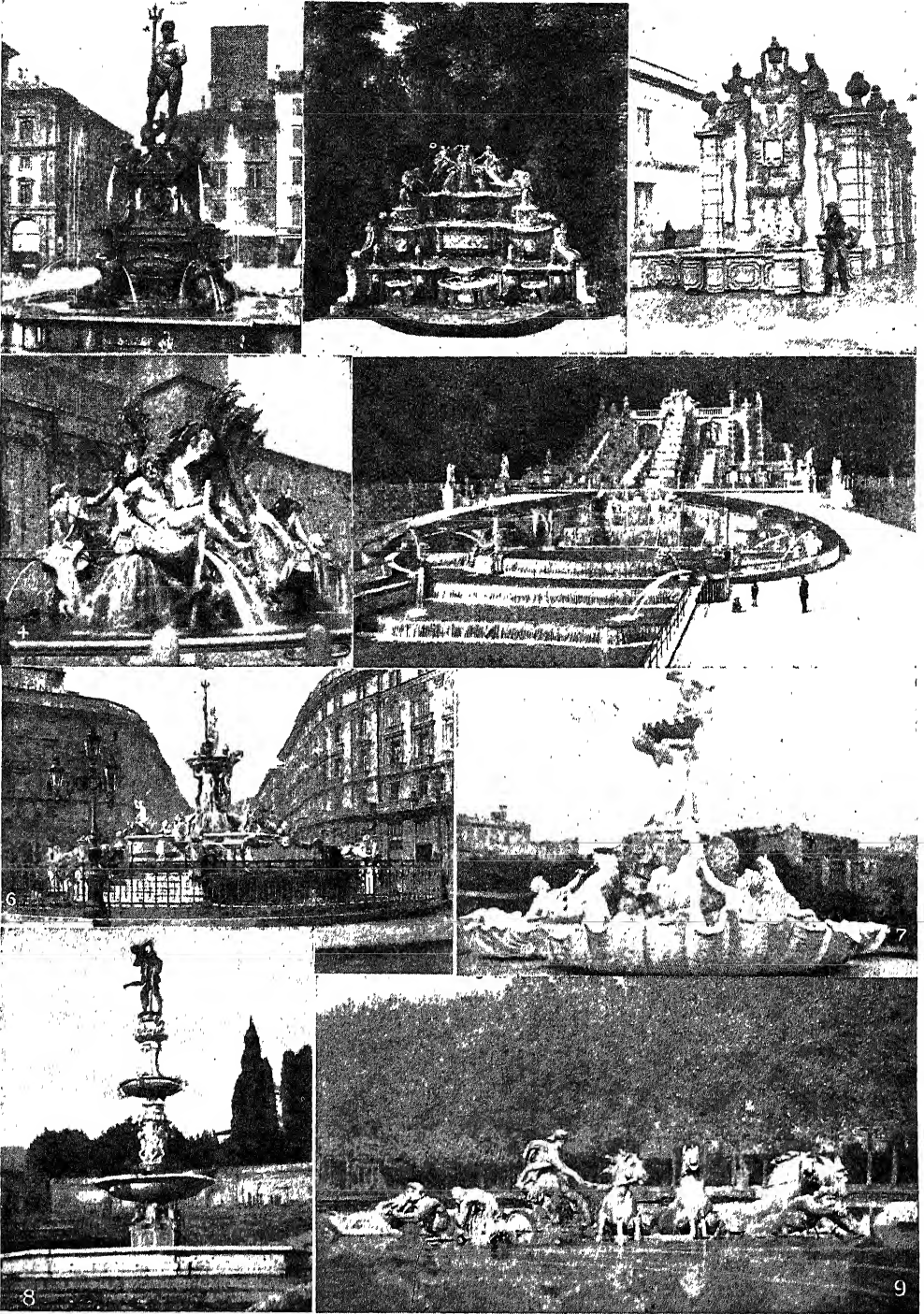
The treatment of fountains was at first purely utilitarian. During the Renaissance, however, the ornate fountain was rapidly developed. The fountains of Berne, each dignified with a name of its own—The Bear, The Ogre, Justice—and the Fountain of the Innocents in Paris (dated 1550) are imposing

architectural structures. The common type of Renaissance fountain was a shallow basin, with a pillar of marble often surmounted by a statue of stone or bronze in the centre, from which projected jets that supplied the running water. The more primitive type was represented by the drinking fountains at street corners. In France, the zenith of fountain-construction was reached under Louis XIV; one may cite the elaborate fountains at Versailles, with their thousands of jets. When the practice of installing a water supply in individual houses was introduced towards the end of the 18th century, utilitarian fountains became rare. But bodies like the Metropolitan Drinking Fountain and Cattle Trough Association, formed in London in 1859, has proved that the demand for this type still exists. Notable ornamental fountains of modern times are the Fontana di Trevi at Rome, and those in the Place de la Concorde, Paris. The illumination of fountains by coloured flood-lighting has proved a popular practice.

**Fountain Pen.** Writing instrument with a reservoir of ink, contained in the hollow penholder, which automatically feeds the nib when the pen is in use, and is so controlled that the ink maintains a steady flow. The first fountain pen was introduced in England in 1835, but was not a success. But in 1884 L. E. Waterman patented his improved fountain pen, and his design continues to be the basis of most types.

The most important part of a fountain pen is the feed bar. A thin channel is grooved along the top of the feed and is in contact with the inner curve of the nib; in the channel are a number of capillary fissures which convey the ink from barrel to point of nib. A small valve in the neck of the barrel admits ink to the feed only when pressure is applied to the nib in the act of writing.

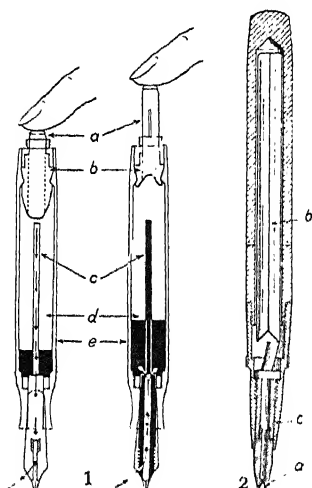
The barrel of the early fountain pen was devoted to the storage of ink, and was filled by means of a syringe. The first self-filling fountain pen had a flexible rubber sac inside the barrel, and attached to the feed assembly. On the outside of the barrel a lever was jointed to a thin strip of metal in contact with the sac; when the lever was raised, the strip of metal was pressed down against the sac, expelling the air. Upon the immersion of the point of the pen in ink, the lever was lowered and the pressure of the metal strip against the sac



1. Neptune fountain at Bologna, by Giovanni da Bologna, 1563-67. 2. Buffet cascade, Grand Trianon Gardens, Versailles, by Hardouin-Mansart, c. 1688. From an old painting. 3. Fountain of Falling Waters, Mexico city, 1755. 4. Fountain in Piazza Navona, Rome, by Bernini,

c. 1650. 5. Grande Cascade, St. Cloud, c. 1690. 6. Medina fountain, Naples, 17th cent. 7. Marble fountain in the gardens of the Paseo Colon, Buenos Aires. 8. Hercules fountain, Villa Reale di Castello, Florence, by N. Tribolo (1485-1550). 9. Basin of Apollo, Versailles, by Le Brun, c. 1680

# FOUNTAIN: EXAMPLES FROM GREAT CITIES OF EUROPE AND AMERICA



**Fountain Pen.** Fig. 1. Self-filling pen; a, plunger; b, diaphragm; c, breather tube; d, feed channel; e, barrel. Fig. 2. Pen with rotatable ball, a, instead of a nib; b, reservoir; c, adapter. Arrows show direction of ink flow

released, which then filled with ink by means of suction.

As the chemical constituents of ink corrode rubber, experiments were made to evolve a self-filling fountain pen which did not require a rubber sac. Sacless pens were provided with a piston in the base of the pen which pumped ink into the barrel. As the piston and sleeve were seldom sufficiently airtight, the pen either was not completely filled or else leaked. In 1932 a more efficient self-filler eliminated the ink sac or piston pump (Fig. 1). The pen was filled by pressing and depressing a plunger (a) which in turn caused a synthetic rubber diaphragm (b) to expand and contract. This forced air out of a breather tube (c) and created a vacuum, which drew ink through the feed channel (d) and into the barrel (e).

Barrels and parts are made of vulcanite or plastics, metals being avoided owing to their liability to corrosion. The nib is generally of gold tipped with iridium, the latter a metal least affected by ink.

A later type of fountain pen (Fig. 2) had a rotatable ball (a) in place of a nib. As the ball moved over the paper in the act of writing, its rotation drew ink from the reservoir (b) through the adapter (c). The ink had a high spirit content so that it dried immediately it reached the paper. When empty the pen was recharged with a fresh reservoir of the special ink required.

**Fountains Abbey.** A ruined abbey in the W. Riding of Yorkshire, England. It stands near the little river Skell, 3 m. S.W. of Ripon; it is in the grounds of the mansion of Studley Royal, while near it is a mansion dating from Stuart times, Fountains Hall. The ruins include those of the church with its tower, the former being 380 ft. long, the chapter house, 13th century choir, the magnificent cloisters, and other parts. They are perhaps the most complete in England and, with the possible exception of Tintern, the most beautifully situated. The abbey, a Cistercian house, was a long time in building. Begun about 1132 it was completed 200 years later. The monks came from S. Mary's Abbey, York. The house was dissolved by Henry VIII and the ruins and lands were sold. In the 18th century they were held by the Aislaby family of Studley Royal. In 1946 the Roman Catholic Church proposed to buy the abbey and restore part as a Benedictine monastery, setting up nine altars in memory of English-speaking nations allied in the Second Great War. *See* *illus. Abbey*, p. 7; *Cloister*, p. 2166.

**Fouqué, FRIEDRICH HEINRICH KARL, BARON DE LA MOTTE (1777-1843).** German author. Born at



**Baron de la Motte Fouqué, German author**

Brandenburg, Feb. 12, 1777, of Huguenot origin, he took part as a cavalry officer in the Prussian campaigns of 1794 and 1813, but literature occupied most of his time. For a while he was the most popular of German story-tellers, but his dependence upon the supernatural militated against a permanent popularity. He is chiefly remembered for his tale of *Undine*, 1811. He died in Berlin, Jan. 28, 1843.

**Fouquet, JEAN (c. 1416 c. 1480).** A French painter, born at Tours. As a portrait painter he was patronised by Étienne Chevalier, treasurer of Charles VII and later of Louis XI. He was one of the greatest French primitives, his best-known works being a Bible, decorated with 150 miniatures, in the Bibliothèque Nationale in Paris; a Book of Hours; and nine miniatures of a manuscript of the *Antiquités des Juifs*. Unappreciated for 400 years, his work was displayed in Paris in 1904 and

recognized to be fundamental in the national art.

**Fouquet, NICOLAS, MARQUIS DE BELLE ISLE, VICOMTE DE MELUN ET DE VAUX (1615-80).** French statesman. Born of a noble family in Paris, Jan. 27, 1615, he held posts in the parliament of Paris while still a youth, becoming procurator-general in 1650. In 1653 Mazarin made him superintendent of finances, and Fouquet used his position to make himself one of the wealthiest men in France. He worked to succeed Mazarin, 1661, as the king's chief minister, but Louis XIV. passed him over.

Fouquet built himself a luxurious palace at Vaux, entertaining lavishly and patronising the arts and letters. But Louis, exasperated by his long mismanagement of the finances and his overweening ambition, had him arrested at Nantes, Sept., 1661. His trial, 1661-64, notorious for its injustice, ended in his imprisonment for life at Pignerol, Piedmont, where he died, March 23, 1680. The theory that Fouquet was the Man in the Iron Mask (*q.v.*) has been proved untenable.

Charles Louis Auguste Fouquet (1684-1761), who conducted a masterly retreat from Prague in 1742 during the War of the Austrian Succession, was a grandson. *Prose*, *Fookay*.

**Fouquier-Tinville, ANTOINE QUENTIN (1747-95).** French Revolutionist. Born at Hérouel, Aisne, and trained for the law, he came to Paris and entered the secret police in 1783. A violent democrat, he joined the extremist party in the Revolution, and was appointed by Robespierre



**A. Q. Fouquier-Tinville, French Revolutionist**  
*From a sketch*

public prosecutor of the revolutionary tribunal, 1793. Utterly inhuman, he sent men and women of all ages and parties to the guillotine, Bailly, Danton, Robespierre, and St. Just amongst them, but in the reaction from the Reign of Terror he himself was guillotined on May 7, 1795.



1. Houdans. 2. Salmon Faverolles. 3. Buff Orpingtons. 4. Dark Dorkings. 5. Silver grey Dorking hen. 6. Silver Duckwing Yokohama cock. 7. Silver Campines. 8. Brown Leghorns. 9. Golden Seabright laced cock and golden laced hen. 10. Partridge Cochins.

Bantams. 10. Spangled Old English game. 11. Modern Langshans. 12. Wyandottes, black cock and white hen. 13. Hamburgs, black cock and golden pencilled hen. 14. Anconas. 15. Wyandottes, silver. 16. Partridge Cochins.

**FOWL: COMMON VARIETIES AND FANCY BREEDS. See Text, p. 3499**

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[See over





17. Andalusians. 18. Leghorns, white cock and buff hen. 19. Polish Silver Spangled. 20. Duckwing game cock. 21. Barred Plymouth Rocks and white Rock hen. 22. Rhode Island Reds. 23. Indian game fowls. 24. Orpingtons, black cock and jubilee hen

25. Speckled Sussex. 26. Hamburgs, silver pangled cock and golden pangled hen. 27. Black Minorcas. 28. Spanish fowl. 29. Black Red Bantam game. 30. Light Brahmas. 31. Dark Brahmas. 32. Silkies.

**FOWL: FAVOURITE BRITISH AND FOREIGN BREEDS. See Text, p. 3499**

**Fourberies de Scapin**, LES (The Tricks of Scapin). Three-act comedy by Molière. Derived partly from classical and partly from Italian sources, its scene is laid in Naples. Scapin, a servant, a character acted by the author, plays a series of tricks on two fathers, so that their sons may marry the two girls with whom they have fallen in love. The girls prove to be the brides whom the duped fathers had originally had in view.

The play, which has been described by Brander Matthews as a Punch-and-Judy piece for grown-ups, was first produced at the Palais-Royal, Paris, May 24, 1671. Otway wrote an English version, *The Cheats of Scapin*, 1677.

**Fourcroy**, ANTOINE FRANÇOIS (1755-1809). French chemist. Born in Paris, June 15, 1755, he was appointed in 1784 to the chair of chemistry at the Jardin du Roi. At the Revolution he became a member of the committee of public safety, and to his indifference is attributed the execution of Lavoisier. Among his discoveries are adipocere, cholesterol, the double salts of magnesium and ammonium, and pure baryta. He died Dec. 16, 1809.

**Four Freedoms**. Term used by the U.S. president F. D. Roosevelt in his message to congress on Jan. 6, 1941. Calling for a new order in international affairs, the president declared that the democratic ideal looked forward to a "world founded upon four essential human freedoms." These were freedom of speech and expression; freedom of every person to worship God in his own way; freedom from want—which meant economic understandings to secure to every nation a healthy peaceful life for its inhabitants; and freedom from fear—which meant a world-wide reduction of armaments so that no nation could commit any act of aggression against its neighbours. The four freedoms formed the basis of the charter of the United Nations drafted at San Francisco in 1945.

**Four Hundred**, TYRANNY OF THE. Oligarchy of nobles established in Athens for four months in 411 B.C. The prime author of the change of government was the exiled Alcibiades (*q.v.*), who knew he could not return to Athens so long as a democratic government was in power; the chief conspirator was Pisander. A reign of terror ensued and the Four Hundred made peace overtures to Sparta. The main Athenian army at Samos was furious, and the people at home, disgusted with the oppressive

measures and pro-Spartan sympathies of the Four Hundred, took matters into their own hands, and restored the democracy.

In 1890 Ward McAllister of New York happened to remark that about 400 people belonged to the best social circle in that city. The "four hundred" soon came into popular use to denote the smart set of any American city, whatever its supposed number.

**Fourier**, FRANÇOIS CHARLES MARIE (1772-1837). French Socialist. Born at Besançon, April 7,



F. C. Fourier,  
French Socialist

traveller. He set himself to evolve a new social system in a series of works, the chief of which are *Theory of the Four Movements*, 1808, and *The New Industrial World*, 1829. He died Oct. 8, 1837.

Fourier's ideas attracted little attention during his lifetime, but were much discussed in the U.S.A., 1840-50. Several communities, notably those of Brook Farm (*q.v.*) and Red Bank, were established to put them into practice, but met with little success. Fourier's theory was that, man being essentially a gregarious animal, the population should be redistributed in a number of new social units, *phalanges*. Each *phalange* was to consist of 1,500 to 1,800 people, housed in a common building or *phalanstère*, with a square league of land attached; was to be industrially complete in itself and self-governing. Each worker was to receive a minimum wage, and the surplus was to be distributed thus: five-twelfths to labour, three-twelfths to talent, four-twelfths to capital.

**Fourier**, JEAN BAPTISTE JOSEPH (1768-1830). French mathematician and physicist. Born at Aux-



J. Baptiste Fourier,  
French mathematician

erre, March 21, 1768, he took an active part in the Revolution in that district. Later he accompanied Napoleon on his Egyptian expedition, and was made governor of

Lower Egypt. On his return to France he carried out experiments on the propagation of heat. His *Théorie Analytique de la Chaleur*, 1822, was based on Newton's Law of Cooling, and contains an account of the mathematical series (*v.i.*) by which he is chiefly remembered. Fourier died May 16, 1830.

**Fourier Series**. A trigonometrical series, involving sines and cosines of simple multiples of a variable which is restricted in possible value between definite limits. Such a series, named after J. B. J. Fourier, is of value in the solution of many problems in physics.

**Four Lakes**. Name given to a series of four lakes in Wisconsin, U.S.A. They are the Mendota, Monona, Waubesa, and Kegonsa, and are situated in the S. part of the state. Occupying an area of 225 sq. m., they are drained to the Rock river, by the Yahara river, and are navigable by steamers.

**Foursquare Gossellers**. Popular name for an evangelical religious sect, whose activities are described under *Elim Movement*.

**Fourteen Points**. Proposals made by President Wilson for the satisfactory conclusion of the First Great War. They were contained in an address to congress on Jan. 8, 1918, and in brief they were: (1) Open covenants of peace openly arrived at. (2) Freedom of the seas. (3) Removal of economic barriers between nations. (4) Guarantees that national armaments should be reduced to the lowest point consistent with domestic safety. (5) Adjustment of colonial claims upon the principle that the interests of the populations concerned must weigh equally with the claims of the government whose title to sovereignty was to be determined. (6) Evacuation of all Russian territory. (7) Evacuation and restoration of Belgium. (8) Freeing of all French territory, and of Alsace-Lorraine. (9) Readjustment of the frontiers of Italy along lines of nationality. (10) The peoples of Austria-Hungary to be accorded opportunity for autonomous development. (11) Evacuation and restoration of Rumania, Serbia, and Montenegro. (12) The Turkish portions of the Ottoman Empire to be assured a secure sovereignty, the other nationalities under Turkish rule to be given opportunity of autonomous development. (13) An independent Polish state, with access to the sea. (14) Formation of a league of nations.

The Fourteen Points were accepted in the autumn of 1918 by

the Central Powers when defeat was staring them in the face, and most of them were incorporated in the peace treaties. Later the Nazis maintained that the non-fulfilment of certain points, in particular No. 4, justified their repudiation of the Versailles settlement.

**Fourteenth Army.** A British formation of the Second Great War; the principal Allied fighting formation in the Burma campaign (*q.v.*). Its existence first became generally known on Jan. 11, 1944, though it had been formed three months previously from India's Eastern Army, after the retreat through Burma up to and beyond the Indian frontier, and its c.-in-c., Lt.-Gen. W. J. Slim (*q.v.*), was already planning to take the offensive under the orders of Gen. Sir George Giffard, c.-in-c. 11th army group. The army sign incorporated a sword, the hilt of which, S-shaped, was a reference to its commander's name. The high-level organization changed in Nov., 1944, when Lt.-Gen. Sir Oliver Leese arrived to take over Giffard's command, subsequently designated Alsea (Allied Land Forces, S.E. Asia).

Three Indian army corps were directly concerned in the Burma campaign—4th, 15th, and 33rd—and at various times 14 divisions served in Slim's command: 2nd and 36th British; 3rd, (Chindits), 5th, 7th, 17th, 19th, 20th, 23rd, 25th, and 26th Indian; 11th East African; 81st and 82nd West African. In addition there were Burmese forces, Lushai brigade, Kachin Levies, and other irregulars, and the total man-power at one time reached over 1,000,000—the largest single army of the war, holding the longest front (from the Bay of Bengal to the Chinese border), and with perhaps the most varied composition.

Although British troops, principally infantry, formed one-third of each Indian division, and also provided the officers and n.c.o.s of the African formations, Indian, Gurkha, and African troops had a large share in the 14th army's remarkable history.

Air supply was gradually built up until the whole of the great force was being fed and equipped by "air-drop," the British, U.S., and Canadian transport squadrons concerned carrying on courageously even in the worst monsoon conditions. Close air support to forward troops and evacuation by air were extensively practised, and the army and air headquarters worked together as a team. In the

later stages, while the 4th and 33rd corps advanced through central Burma, the 15th, in Arakan, was detached under direct command of c.-in-c. Alsea, and the 36th division fought in the northern (U.S.-China) combat area.

After the reoccupation of Rangoon in May, 1945, 14th army H.Q. was moved back to India to direct the invasion of Malaya and the East Indies. A new Indian corps, the 34th, was destined as the spearhead of this operation. Following the establishment of his new H.Q. in Singapore in Sept., Gen. Slim handed over command to Gen. Sir Miles Dempsey (*q.v.*). On Dec. 1, 1945, the 14th army was disbanded. Official figures showed that, in its two years' existence, the 14th army had killed a total of 120,000 Japanese for a loss of only 17,000, despite a fanatical enemy, lack of equipment, appalling climate, and a heart-breaking terrain.

G. D. H. Linton

**Fourth.** Musical interval which includes four consecutive scale names, *e.g.* C, D, E, F. The interval between C and F is called a fourth, and as F is the fourth degree of the scale of C this is called a perfect fourth, and by some a major fourth. *See* Interval.

**Fourth Dimension.** (1) Term used in mathematics to express the degree of an item. Thus  $abcd$ ,  $a^4$ ,  $a^{2/2}$ , are all of the fourth dimension or degree because they are products of four factors.

(2) A quantity is of the fourth dimension when its expression involves four fundamental measurements; *e.g.* the statement of the heat conductivity of a substance

needs four fundamental dimensions, mass, length, time, and temperature.

(3) The term has been used particularly in connexion with various systems of geometry, elaborated principally in the 19th century by Riemann, Cayley, Minkowski, and others. Some of these geometries incorporate time as an essential dimension of space (or space-time) and deny certain fundamentals of ordinary (or Euclidean) geometry, such as the ideas concerning parallel lines; others were based on the line as the unit measurement instead of the point; others attempted a spatial interpretation of relationships between lines, points, surfaces, and solids in theoretical space of  $n$  dimensions. These geometries helped greatly in the "geometrisation of physics," and the development by Einstein and others of the theory of relativity. *See* Mathematics. *Consult* also *The Fourth Dimension*, C. H. Hinton, 1904; *Geometry of Time and Space*, A. A. Robb, 1936; *Physics and Experience*, B. Russell, 1946.

**Fourth Estate.** Term sometimes applied to the press to emphasise its importance in the state, the three estates of the realm according to the constitution being the lords spiritual, lords temporal, and commons. The term was first used by Edmund Burke.

**Fourth of June.** Speech day and holiday at Eton College. The anniversary of the birthday of King George III is the principal celebration at Eton and is attended by boys' relatives and Old Etonians. In the morning a master calls "absence," when every boy must answer his name, this ceremony being followed by speeches in Upper School. Cricket matches are played, and in the evening a firework display and a procession of decorated boats terminate the celebration.

**Fourth Party.** Name given about 1880 to a small independent and irresponsible body of Conservative politicians. The leading men were Lord Randolph Churchill, Sir H. Drummond Wolff, Sir John E. Gorst,



Fourth of June. "Absence" being called during the annual celebrations on this day at Eton College



and at times A. J. Balfour. Throughout the parliament of 1880-85 they frequently opposed and harassed the Conservative leader of the commons, Sir Stafford Northcote.

**Four-Year Plan.** Name given to two programmes of economic development in Nazi Germany. Hitler announced the first four-year plan in May, 1933—ostensibly a modest scheme for housing, road construction, and other public works. This work was executed, but served really as a façade behind which the rearming of Germany had begun. The second plan covered the years 1937-40 and was concerned with the development of substitute materials with a view to attaining self-sufficiency. It referred especially to oil from coal, synthetic rubber, artificial textiles, and the exploitation of Germany's ore reserves. Self-sufficiency had not been achieved in any field when Hitler launched the Second Great War in 1939.

**Fowey.** Borough, port, market town, and resort of Cornwall, England. It is on the W. shore of the Fowey estuary, 10 m. S. by E. of Bodmin, on the rly. It has a fine harbour, formerly protected by three forts now in ruins, and is a favourite holiday resort and yachting station. A leading port in the Middle Ages, it supplied nearly 50 vessels for the blockade of Calais in 1346. There is a trade in china clay. Sir A. Quiller-Couch, long a resident, put Fowey into his novels as Troy Town. Market day, Sat. Pop. (1951) 2,347. *Pron.* foy.

**Fowl** (A.S. *fugol*, bird). Name formerly meaning any bird, now applied to the various species of the genus *Gallus* of the pheasant family of the zoological order Gallinae, to which the game birds generally belong. Most of them have handsome plumage and strong legs, being better adapted for running than for flight. They range in size from the quail to the turkey, are mixed feeders, and are all valued for the table.

The many varieties of domestic fowl are certainly descended from the wild jungle fowl of India. The jungle fowl, which flourishes well in captivity, breeds freely with the domestic varieties, and the hybrids are always fertile. There is no record of the original domestication of the jungle fowl. It is possible that the bird was caught in greater numbers than were required for food at the moment, and that it was then found possible to keep it for a time in captivity, where it bred,

this suggesting a means of multiplying and maintaining a supply of food always at hand.

There is no trace of the fowl among the remains of birds and animals found in the kitchen middens of the Neolithic period, and it does not appear to have been known to the Greeks of the Homeric age. But it is mentioned in a Chinese encyclopedia compiled about 1400 B.C., though it is not clear if the wild or the domesticated bird is meant. There are, however, records in the code of Manu of cock-fighting in India about 1000 B.C., and this makes it probable—though not certain—that domestication had taken place at an earlier date. It is curious that the spread of the domesticated fowl westwards was due to the love of cock-fighting rather than to any appreciation of the value of the bird as an article of food. Aristotle in his *History of Animals* mentions the domestic fowl and gives various details of its habits and laying powers; but there is no mention of domestic fowls in the Old Testament of the Bible.

colour, but in only one way, namely, a brown cock crossed with a grey hen will produce grey male chicks and brown female chicks. No such differentiation occurs when a grey cock is crossed with a brown hen.

The best breed or strain varies with the purpose for which the bird is required—for egg production, for table quality, or for ornament. Egg production does not as a rule help the eating quality of the flesh, and breeding for eggs or meat will prevent ornamental development. Female birds up to twelve months old are called pullets, from 12 to 24 months yearlings, and only at 24 months old become hens. They begin to lay at five to six months.

Egg-producing birds tend to be small, seldom exceeding 7 lb. in weight. Average annual production of a good bird is 150-200 eggs. The Rhode Island Red, the Wyandotte, the Sussex, the Leghorn, and the Buff or Plymouth Rock are the principal laying breeds, and it is mainly with these breeds that experiments in crossing have been made.



Fowey. Picturesque seaport on the south Cornish coast, the "Troy Town" of "Q's" novels; it lies on the W. shore of the Fowey estuary

It is not known when the bird first reached Great Britain, the statement that it was brought by the Phoenicians being pure speculation. It is thought that the breed now known as Dorkings was introduced by the Romans, but here again decisive evidence is lacking. But cock-fighting was popular in Britain many centuries back, the earliest definite record dating from the reign of Henry II, when William FitzStephen wrote an account of the cock-fights that took place in schools on Shrove Tuesday.

Crossing between breeds of domesticated fowl has happened to such an extent that the parent breed is obscure. Sex is shown by

The pullet produced by crossing a Black Leghorn cock with a Rhode Island Red hen is black tinged with red and is an excellent layer, but the offspring of a Rhode Island Red crossed with a Light Sussex hen is a much better table bird.

The Rhode Island Red is usually chestnut in colour with yellow legs and orange eye. The Light Sussex is white with a black tail. Both are good table birds. The White Leghorn and the Black Leghorn are very good layers but poor table birds. The Buff Rock and the White Wyandotte are heavier birds and suitable for the table. Orpingtons, Minorcas, Brahmas, and Cornish are also

bred for the table, the first two being white-skinned. *See* col. plates facing pp. 3496-97; *also* Poultry.

**Fowler, ALFRED** (1868-1940). British astronomer and spectroscopist. Born on March 22, 1868, in Yorkshire, he studied astrophysics at the Royal College of Science under Lockyer. On the removal of the Solar Physics Observatory to Cambridge in 1901, he was appointed assistant professor of astrophysics and founded at S. Kensington a unique laboratory in which the spectra of astronomical bodies were reproduced and identified. He took part in six eclipse expeditions, photographing for the first time the flash spectrum (*q.v.*) and making the first accurate measurements in the spectrum of the corona. His spectroscopic work formed the observational basis for Bohr's theory of atomic structure. Fowler was president of the Royal Astronomical Society, 1919-21, F.R.S. from 1910, and created C.B.E. in 1935. He died June 24, 1940.

**Fowler, ELLEN THORNEYCROFT** (1860-1929). British novelist. She was a daughter of the 1st Viscount Wolverhampton and married A. L. Felkin in 1903. She died June 21, 1929. Most of her stories, which include *Concerning Isabel Carnaby*, 1898; *A Double Thread*, 1899; *The Wisdom of Folly*, 1910, reflect life in the English Midlands under Methodist influence.

**Fowler, HENRY WATSON** (1858-1933). English lexicographer. He was born at Hinton St. George, Somerset, March 10, 1858, and became a master at Sedbergh in 1882. He retired in 1889 and lived quietly until 1915, when he joined the British army in France in his 57th year. At the end of the First Great War he returned to his researches and died Dec. 26, 1933.

Fowler was one of the most remarkable scholars of his day and had the ability to endow his pronouncements with persuasive charm and finality. At first in collaboration with his brother, F. G. Fowler, and later by himself he produced a series of textbooks which became oracles in the determination of correct English. A highly praised translation of *Lucian* appeared in 1905; *The King's English* in 1906. The brothers produced the *Concise Oxford Dictionary* in 1911, and after his brother had been killed, Henry continued the *Pocket Oxford Dictionary*. His supreme achievement was *A Dictionary of Modern*

English Usage, 1926. Two revealing books in 1929 were *If Wishes Were Horses*, and *Some Comparative Values*.

**Fowler, SIR JOHN** (1817-99). A British engineer. Born July 15, 1817, he became a civil engineer and was employed in railway schemes which accompanied the boom of 1846. Pimlico Bridge was built according to his designs in 1860. The same year he was engaged in the construction of the Metropolitan rly., opened 1863. In 1869 he was consulted by Ismail Pasha with regard to engineering schemes in Egypt. In 1883, in partnership with Benjamin Baker, he designed the Forth Bridge, which was opened in 1890. For this Fowler, who had been knighted in 1881, was made a baronet. He died March 27, 1899.

**Fowler, WILLIAM WARDE** (1847-1921). British scholar and ornithologist. Born May 16, 1847, son of a Swansea magistrate, he was elected to a fellowship at Lincoln College, Oxford, in 1872, becoming sub-rector ten years later. His volume on *Julius Caesar*, in 1892, was the first of a series of classical studies. His books on bird life added much to existing knowledge, the best known being *A Year with the Birds*. He died June 14, 1921. *A Life*, by R. H. Coon, appeared in 1934.

**Fowler-Dixon, JOHN EDWIN** (1850-1943). British athlete. Born Sept. 3, 1850, he devoted himself to athletics, and in 1877 won the 50 miles and the 100 miles amateur walking records. In 1884 and 1885 he created 50 miles running records of 6 hrs. 20 mins. 47 secs. and 6 hrs. 18 mins. 26 secs., respectively. In the former year he also made the 40 miles running record of 4 hrs. 46 mins. 54 secs., which had not been beaten when he died, Oct. 10, 1943. Proprietor of the *Athletic News*, he helped to found the Amateur Athletic Association, whose trophy for the two miles walk perpetuates his name.

**Fowler's Solution.** Popular name for *liquor arsenicalis*. It is a 1 p.c. solution of arsenious acid in water with small amounts of potassium carbonate and compound tincture of lavender, used occasionally in medicine, chiefly in morbid conditions of the blood.

**Fox.** Animal belonging to the genus *Vulpes*, probably consisting of only one species including several local races. It differs from dogs in the shape of its skull, and in the fact that the pupil of the eye is elliptical instead of circular. It is of slim build, with long bushy tail and rather long ears.

Foxes feed upon small mammals and birds, but also eat insects and fruit, feeding by night and spending the day in burrows, hollow trees, and clefts in rocks. They are found nearly everywhere throughout the northern hemisphere; and

the common fox (*Vulpes canis*) is a well-known inhabitant of Great Britain.

It is reddish-brown in colour, with white beneath; but the hue varies considerably in local races, as in the so-called greyhound fox of the Lake District. It sometimes makes its own burrow, though it usually adapts that of the badger or rabbit.

In the summer it often sleeps in a dry ditch. The young, usually four or five in number, are born about April.

The fox is valued for its fur, especially that of the black and silver varieties. It is a favourite animal for hunting, but often works havoc in game preserve and poultry yard. It would have become extinct in Great Britain long ago but for its preservation by the hunts. *See* Fur.

**FOX OR NEENAH RIVER** of Wisconsin, U.S.A. Rising in the S. part of the state, it flows S.W., N., and N.E. to Lake Winnibago. Emerging from the N. end of that lake, it follows a N.W. course to Green Bay, a branch of Lake Michigan. In its upper reaches, near Portage, it is connected by a canal with Wisconsin river. It is 250 m. long, and navigable for most of its course.

**FOX OR PRUITAKA RIVER** of the U.S.A. Rising in Wisconsin, it flows 225 m. generally S. and S.W., and passes through Illinois to unite with the Illinois river at Ottawa.

**FOX.** Channel of N. America. It lies to the N. of Hudson Bay, separating Baffin Island on the E. from Melville Peninsula and Southampton Island on the W. It communicates by Hudson Strait with the Atlantic, and by Fury and Hecla Strait with the Arctic. Luke Fox, English navigator, explored it in 1631.



Fox. Common fox, *Vulpes canis*, emerging from its earth

**Fox, Sir Charles (1810-74).** British engineer. The son of Francis Fox, M.D., he was born at Derby, March 11, 1810. Having shown a distinct gift for mechanics, he was articled to an engineer, and was soon associated with Robert Stephenson and other pioneers of the steam engine. He did engineering work on various rlys., especially the London and Birmingham, and the firm of which he became a partner began to make rly. stock, introducing therein various improvements suggested by him. Fox built the Crystal Palace in Hyde Park and afterwards at Sydenham, and was very successful with his bridges. An enormous length of rly. line, almost in every part of the world, was undertaken by his firm, as well as tunnels, stations, among them Waterloo, Paddington, etc. In 1851 he was knighted. He died June 14, 1874, leaving his two elder sons to carry on the business of Sir Charles Fox & Sons.

**Fox, Sir Charles Douglas (1840-1921).** A British engineer. Born May 14, 1840, educated at Cholmondeley School



Sir C. Douglas Fox,  
British engineer  
Russell

and King's College, London, he joined his father, Sir Charles Fox, in business in 1861. Associated with him in railway and other engineering work, he soon came to the front. He was president of the Institute of Civil Engineers, and in 1886 was knighted. He died Nov. 13, 1921.

A brother Francis (1844-1927) joined the firm 1861, being knighted in 1912. Sir Francis was called in to advise on the restoration of Winchester Cathedral, and was one of the experts consulted about the construction of the Simplon Tunnel. His published books include *The Mersey Tunnel* and *The Simplon Tunnel*. He died Jan. 7, 1927.

**Fox, Charles James (1749-1806).** British statesman. Born in London, Jan. 24, 1749, he was a younger son of Henry Fox, Lord Holland; his mother was a daughter of the duke of Richmond. He was educated at a school at Wadsworth, at Eton, and at Hertford College, Oxford. He read widely, and his industry, coupled with his great natural abilities, made him a scholar. In addition to a knowledge of the classics, he was a good French scholar and read Italian well. He was only a boy when,



C. J. Fox

After Reynolds

encouraged by his father, he began his career as a gambler and shared the other pleasures of his dissolute elders. In 1769 he entered parliament as M.P. for Midhurst, his father's pocket borough, and in 1770 he was made a junior lord of the admiralty under Lord North. In 1772 he resigned owing to his opposition to the court, but in 1773-74 he was again in office as a junior lord of the treasury.

Fox's career as a Whig leader may be dated from 1775. By then he had won the friendship of Burke, and had shown, in the case of the American colonies, for instance, that attachment to the cause of popular liberty which is the outstanding feature of his political career. He acted with the Whigs, then led by Lord Rockingham, but in many matters he was more advanced than they. His creed included parliamentary reform and purity in financial affairs, while, like many others, he saw a danger to the state in the undue influence of the crown. Soon came his advocacy of the repeal of Roman Catholic disabilities and of the causes of Ireland and the slave.

In 1782 Fox entered the cabinet of Lord Rockingham as secretary of state, but in a few months the premier died, and, refusing to serve under Lord Shelburne, he joined Burke and Sheridan in a Whig secession which in 1783 resulted in the extraordinary coalition between Fox and Lord North. In this the former was again a secretary of state, but this ministry had but a brief life. It was dismissed by the king as soon as the house of lords had rejected Fox's India Bill.

Fox, who in 1784 had fought at Westminster—for which constituency he had been first returned in 1780—one of the most fiercely con-

tested battles in electoral history, now appeared as a leading opponent of Pitt's ministry, although on some matters—the impeachment of Hastings, for instance—he was in agreement with the premier. In 1789 came his famous declaration of welcome to the French Revolution, an encomium on the fall of the Bastille, and in 1791 his long friendship with Burke came to an end on this issue. By 1792 the majority of the Whigs had ceased to hail the Revolution with rapture, regarding it rather as a tyranny; but Fox, almost alone, continued to support it. He declared against the war with France, but by now he had few followers, and after 1797 he ceased for a time to attend parliament. In 1798, for declaring publicly for the sovereignty of the people, his name was removed from the list of privy councillors.

About 1802 Fox returned to public life. He remained in opposition until the death of Pitt in 1806, when he again became a secretary of state, this time in the ministry of all the talents. He then endeavoured to negotiate a peace with France, but he soon realized that he had misread Napoleon's character. His health was already failing, and on Sept. 13, 1806, he died at Chiswick. He is buried in Westminster Abbey.

The vices and the virtues of Fox were both on the large scale. A leading member of the dissolute circle that surrounded the Prince Regent, he lost an ample fortune at cards, and was more than once bankrupt, dependent upon the charity of his friends. He showed, as did others, a lack of consistency between words and deeds, while he was capable of carrying his private animosities into public life. For constructive statesmanship he showed no ability whatever. On the other hand, he was a great orator and a greater debater. To the last his mind maintained its freshness by contact with the masterpieces of literature. He possessed a really generous nature, while his sympathy with the oppressed was the outcome of genuine feeling. He was long the idol of the Whigs, among whom his is undoubtedly the greatest name. In 1795 he married his mistress, Mrs. Armistead, and his later life was passed at St. Anne's Hill, near Chertsey. He began a life of James II, was something of a sportsman, and had fought a duel. See Pitt.

A. W. Holland

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C. J. Fox, Sir G. Trevelyan, 1880; Charles James Fox, J. le B. Hammond, 1903; The Holland House Circle, Lloyd Sanders, 1908.

**Fox, FREDERICK** (1888-1945). British jockey. He served his apprenticeship with F. Pratt and rode his first winner at Warwick, April 8, 1907. He was champion jockey in 1930 with 129 winners, and Cameronian gave him his first success in the Derby in 1931. In 1935 Fox won the 2,000 Guineas and the Derby on Bahram, and rode as first jockey for George V, retiring at the end of 1936. He was killed in a motor accident, Dec. 12, 1945.

**Fox, GEORGE** (1624-91). Founder of the Society of Friends (*q.v.*). He was born at Drayton-in-the-Clay (now Fenny Drayton), Leicestershire, in July, 1624, son of (Christopher Fox, a weaver, called by his neighbours "righteous Christer." His early bent towards religious



George Fox,  
English Quaker

study suggested to his relatives that he should be made a priest. He was, however, apprenticed to a shoemaker and grazier in Nottingham. At the age of 19 he began a series of solitary wanderings in which he sought peace of mind from both churchmen and non-conformists, finally to decide that the one great qualification for the ministry was the presence of God in the heart - the inspiration of the Inward Light.

In 1648 he began to preach in public, adopting the terms "thee" and "thou," opposing many social conventions as well as ecclesiastical formalism, refusing to take oaths, condemning war, and advocating a rigid simplicity of dress. By 1658 communities of his followers were established in all parts of England. Founder and followers were, however, bitterly persecuted, Fox going to prison eight times. When in 1650 he bade the magistrates "tremble at the word of the Lord," he earned for his sect the nickname of Quakers.

In 1669 he married Margaret Fell, of Swarthmore Hall, widow of a judge and one of his early converts. He visited Scotland, 1657; Ireland, 1669; North America and the West Indies, 1671-72; and Holland, with Penn and Barclay, 1677 and 1684. Shortly after a meeting at the Friends' Meeting House, Gracechurch Street, Lon-

don, he died close by in White Hart Court, Jan. 13, 1691, and was interred in the Friends' Burial Ground, Bunhill Fields.

A man of sterling character whose practical gifts were displayed in the organization he gave to the society he founded, his voluminous writings are now seldom read, with the exception of his *Journal*, which, revised by a committee under the superintendence of Penn, first appeared in 1694. The MS. was sold at Sotheby's, July 26, 1920, for £1,750, and is now in the possession of the Society of Friends.

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**Fox or FOXE, RICHARD** (c. 1448-1528). English statesman and prelate. Born at Ropesley, Lincs, the son of a yeoman, he was for periods at both Oxford and Cambridge. In 1485, in France, he entered the service of Henry VII. He began as the king's secretary, but was soon lord privy seal. Already ordained, and vicar of Stepney, he was made bishop of Exeter in 1487; in 1492 he was translated to Bath and Wells, and in 1494 to Durham. From 1501 until his death he was bishop of Winchester.

Fox was Henry's chief adviser, and most of the diplomatic work passed through his hands, including the momentous marriage and commercial treaties of this reign. Soon after the accession of Henry VIII, however, he lost his power. He was too steeped in the peaceful traditions of Henry VII to approve of the spirited foreign policy of the new era. Wolsey was too strong for him, and he resigned the privy seal in 1516. He died at Winchester, Oct. 5, 1528, being buried in the cathedral. Fox's great work was the foundation of Corpus Christi College, Oxford. At Cambridge he was chancellor and master of Pembroke Hall.

**Foxe, JOHN** (1516-87). English martyrologist. Born at Boston, Lincs, and educated at Oxford, he was a fellow of Magdalen, 1539-45. He was a tutor in the Lucy family at Charlecote, and in the Howard family at Reigate. During Mary's reign he lived on the Continent, where he met Knox and other reformers, publishing in Latin at Strasbourg the first draft of his *Acts and Monuments*, familiarly known as *Foxe's Book of Martyrs*. On Elizabeth's accession Foxe

returned to England, was ordained priest by Grindal, lived in Grub Street, and worked on his *Acts and Monuments*.

published in folio by John Daye, 1562-63. He became prebend of Salisbury and vicar of Skipton, 1563; and preached at Paul's Cross.

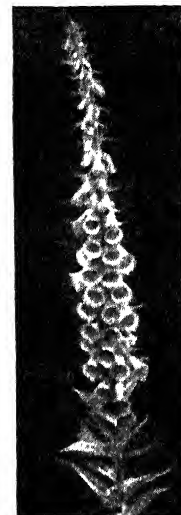


John Foxe,  
English martyrologist

He died April 18, 1587, and was buried at St. Giles's, Cripplegate. His principal work was a great favourite with Bunyan, greatly influenced the progress of Protestantism in England, and, although bitterly prejudiced, is an example of vivid prose.

**Foxer.** Anti-submarine device used in the Second Great War. In 1943 German U-boats began firing a torpedo that could "home" on the noise of a ship's propeller and chase its victim before striking. A foxer was employed to upset the "brain" of this acoustic torpedo; a noise-maker which was towed astern of a ship and acted as a decoy. Not a single ship was sunk while using it.

**Foxglove.** Hardy biennial and perennial plants of the family



Foxglove. Flower  
of *Digitalis purpurea*

Scrophulariaceae and genus *Digitalis*. Only one is a native of Great Britain, though there are a number of other species, the majority of botanical value only, which were introduced from Asia and Europe. Their height is from 2 ft. to 5 ft., and their flowers are purple, pink, white, yellow, or brown. They are raised from seed sown in gentle heat in May,

the plants being moved to the open air as soon as they are large enough to be shifted with safety. In sheltered shrubberies and copses a little seed may be sown annually. In mixed borders foxgloves should be placed at the back, in associa-

tion with delphiniums, hollyhocks, sunflowers, and other tall-growing subjects. The wild purple foxglove of our lanes and woods is *D. purpurea*. See *Digitalis*.

**Foxhound.** Breed of hound specially maintained for hunting the fox. Foxhunting dates from the days of Edward I, but the dogs then used were entirely different from the present breed of hounds. The earliest pack used exclusively for hunting the fox was the Charlton in Sussex, about 1689. The basis of the present-day foxhound was probably one of the common hounds of the country, with crosses into other hound breeds to reinforce its scenting capacity, speed, and endurance.

Standing about 23 to 24 inches at the shoulder, the foxhound has a broad skull, a long neck, and a deep brisket. Strong bone and muscles throughout are essential for the work required. The coat is short, thick, and parti-coloured.

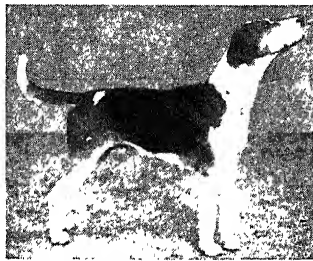
Hounds used in hunting, such as foxhounds, beagles, harriers, and otterhounds, are probably the only dogs, apart from the Huskies used as draught dogs in arctic regions, to lead the traditional lives of their remote ancestors, living and hunting in packs.

The breed has received much attention, and such English packs as the Belvoir and the Quorn are of world-wide fame.

**Foxhunting.** Sport of the English countryside in which a fox is hunted, with intent to kill, by the aid of a pack of specially bred and trained hounds called foxhounds. The earliest pack was the Charlton in Sussex, c. 1689; the Bilsdale in Yorkshire (the duke of Buckingham) and the South and West Wilts (Lord Arundell of Wardour, 1690-1700) are of about the same time. In the early days of foxhunting, great landowners kept packs of hounds, their kennels being moved from place to place, which hunted over immense areas, later hunted by several recognized packs. Hunting was a slow and laborious process, the foxhunter starting at daybreak and laying his hounds on to the drag of the fox which was then hunted steadily up to where he had laid up for the day. Roused, the fox was then worn down in a long and slow hunt of many hours. An increase of pace began in the Quorn country about 1750 under the aegis of Hugo Meynell, and also in the Pytchley, then controlled by the Lord Spencer of the day. Hounds began to be bred for speed, and the thoroughbred

was introduced into the hunting-field, an innovation not favoured even as late as the 1840s. A hundred years later the half-bred horse was commonly ridden.

With the enclosure of common lands, jumping became fashionable, and others besides the rural population became interested. The repeal of the corn laws, causing the change of so many tilled fields to pasture—particularly in the Midlands where the fashionable packs are to be found—was a final factor which encouraged speed. The heyday of fast hunting



Foxhound. Hound from the kennels of the Oakley foxhounds

in "the shires" was from the 1870s until the First Great War, when a very fast horse which could jump whatever in reason came in its way was essential to the ambitious follower of the hunt.

Long hunts were still not uncommon even as the pace increased, and points (i.e. the farthest straight distance from "find" to "kill") of anything up to ten miles were frequently made, while the distance "as hounds ran" was nearly always very much more, all covered at a good gallop. Such achievements were possible only through the improvement in staying power of hounds brought about by careful breeding.

The old slow tactics, however, disappeared, and the fox was killed as much by pace as by the actual hunting of his line. Thus for many of the field, hunting became a matter of hard riding rather than of vinery.

Twentieth century hunting is something between the two. Less damage is done, and large "fields" out solely for the ride, many of them in no way connected with the land over which they ride, are not so usual. The establishment of aerodromes, the enclosure of land occupied by T.T. herds, more tillage, and an increase of wire everywhere, leave plenty of scope for foxhunting, but make the old hard riding impossible.

The nature of a hunt depends in general upon the character of the

country in which it takes place. A well-wooded country, with coverts close to one another, provides the best scope for hound work, whilst open land with some distance between coverts gives most chance of a good gallop. There are approximately 200 packs of hounds in Great Britain today recognized by the Master of Foxhounds association, which is the governing body, establishing boundaries, and laying down rules for the conduct of the chase. Only the master of a pack recognized by the association may place the initials M.F.H. after his name. The Quorn, Pytchley, Belvoir, Fernie's, and Cottesmore are usually known as "the Shires," and fall into the "open country" category, but many provincial packs come very near to the same description. Well known hunts famed for good hunting, and many of them covering both kinds of country, include The Duke of Beaufort's (a very large country centred round Badminton); the Warwickshire; the Bicester, Grafton, and Whaddon Chase in the home counties; the York and Ainsty (two packs); Cheshire; and Blackmore Vale in Dorset and Somerset.

Riding to hounds is only a part of the enjoyment to many who are interested in watching the work of hounds and huntsman in overcoming the wiles of probably the cleverest of all cluders. A good huntsman knows his country and has a very good idea of the probable line his hunted fox will take, where it is likely to be found initially, and how to keep with his hounds so as to be at hand should they require his assistance. He will also know when to leave them alone. His hounds are individuals to him and he appreciates and relies upon the individual quality of each. Some hounds are particularly expert on a cold and stale scent, some are distinguished by the determination with which they penetrate the thickest cover; some are "babblers," other only "speak" when they are sure. It is in watching the handling of this diverse team that the enthusiastic foxhunter gets a great deal of his pleasure.

The cost of hunting is met by those who hunt, by those who, while not hunting themselves, yet take an interest in and subscribe to, their local pack, and, in increasing numbers, by the farmers over whose land the hunt passes. Farmers are in general staunch

foxhunters, assisting hunt establishments in kind (in the form of forage for hunt horses or dead stock for hounds) as well as with subscriptions, and getting wire taken down wherever possible during the hunting season. Indeed, the survival of the fox depends upon the good will towards the chase of the rural population in general.

The Master of a pack of hounds undertakes to hunt the country so many days a week with a certain subscription, making up the balance as may be required himself. Prior to 1939 the cost of hunting a country was estimated at £1,000 per annum for each day in the week hunted, i.e. a four days a week country cost £4,000 a year. When hunting was renewed at the end of the Second Great War costs had risen by at least 50 p.c. Control of a country by a committee has tided many packs over emergencies such as inability to find a Master. (Committees are, however, never more than stop-gaps; individual leadership is essential to the well-being of a country. The money provided is spent on wages for the huntsman (unless the Master hunts hounds himself), one or two whippers-in, at least two more men in stables to ride "2nd horse" at meet, a stud groom, kennel man, one or two feeders (according to the number of hounds kept in kennel, anything from 20-75 couple), and payment to earth stoppers, those who seal up the fox-earths in the night whilst the foxes are out, so that the hunted fox shall not find refuge underground if it can be prevented—an onerous task if properly performed. Oatmeal and flesh for hounds, and fodder for hunt horses, have to be found; compensation claims for damaged fences or the loss of poultry taken by foxes have to be met. Hunt servants' livery is another item, and saddlery for hunt horses.

Foxhunting encourages the breeding of the English hunter—a type of horse eagerly sought after all over the world. Hound-breeding is almost an industry, and the British foxhound is perhaps the greatest triumph of dog-breeding in the world. Evolved from a deer-hunting dog, the foxhound will hunt deer, fox, hare, or otter according to training. There are many breeds of hound hunting by scent in Europe and America, but the English type leads them all and is always saleable abroad.

Lionel Dawson.

(Bibliography.) Beckford on Hunting, 1796; Life of a Fox, Thomas Smith,

1920; Hunting the Fox, Lord Willoughby de Broke, 1920; Wild Lone, "R.B.," 1938.

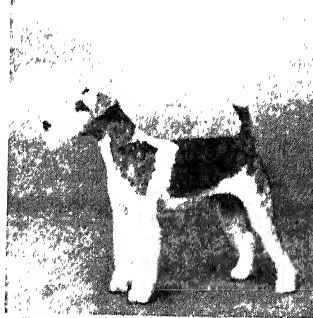
**Fox Islands.** Variant name given to the Aleutian Islands (*q.v.*). It is more specifically confined to the extreme E. group, consisting of Unalaska, Unimak, Umnak, and a number of smaller islands.

**Fox Land.** Desolate region in the S.W. of Baffin Island, British N. America. It lies between Fox Channel on the N.W. and Hudson Strait on the S.E.

**Foxtail.** Means of preventing a bar of wood or metal bolt from being withdrawn from a hole. The entering end is split, the point of a wedge is inserted, and the bar is driven home, the wedge expanding the material against the sides of the hole.

**Foxtail Grass** (*Alopecurus pratensis*). Perennial grass of the family Gramineae. It is a native of Europe, N. Africa, and Asia. It sends out runners from the roots, and has flowering stems 1 ft. to 3 ft. high. The leaves are rough and flat; the flowers form a soft, cylindric panicle. It is a most valuable meadow-grass, and of high nutritive value.

**Fox Terrier.** Small breed of terrier, of two types: smooth-haired and wire-haired. The smooth-haired type came first into favour and remains more popular.



Fox Terrier. Prizewinning dog of the wire-haired variety

Height should be about 15½ ins. at the shoulder, hitches rather less; weight 16-18 lb. In colour white should predominate, with black or tan markings; brindle, red, or liver markings are not approved.

The fox terrier was originally used by hunts to go to ground after foxes, and though few present-day dogs have ever seen a fox, they are alert, smart, sporting little dogs, ready to take on any vermin; they are excellent ratters. Pictures in colour of a smooth-haired and a wire-haired fox terrier are shown in the plate facing page 2760.

**Foxtrot.** Dance of American origin from negro sources. As a comparatively simple social dance for two partners, based on an adaptation of the march step to ragtime rhythm, it rapidly became popular in every part of the world from 1914, replacing the waltz as the most frequent item in "ballroom" dance programmes. Later it became more of a generic term for a style of dance than the name of any particular sequence of movements. Foxtrots may be either fast (quickstep) or slow (approximating to the Blues), simple or complex. See Dancing, Ballroom.

**Foy, MAXIMILIEN SÉBASTIEN** (1775-1825). French soldier. Entering the army in 1791, he first



Maximilien Foy. French soldier

saw service under Dumouriez. Distinguishing himself in Italy, 1801, and in the Austrian campaign, 1805, he was sent by Napoleon in 1807 with a small force to the sultan against the Russians and British. In 1808 he was in Spain, and fought in the Peninsular War, being made a divisional general in 1810. He held a command at Waterloo, where he was wounded. After 1815 he made his peace with the new regime and sat in the French chamber as deputy for Aisne. He died in Paris, Nov. 28, 1825. His history of the Peninsular War was published from his notes in 1827, and his Discours in 1828.

**Foyers.** Name of a river of Inverness-shire, Scotland, and of a waterfall in its course which is made up of two cascades, one 40 ft. high, the other 165 ft. Foyers waterfall, near the point of entry of the river into Loch Ness, on its eastern shore, was in 1895 harnessed to generate electricity for an aluminium smelting plant established here in a new village, also called Foyers. Owing to the lack of interest in the factory shown by local people, most of the workers in the plant were recruited in England.

**Foyle.** Lough or inlet between co. Donegal, Irish Republic, and co. Londonderry, N. Ireland, into which drains the river Foyle, 16 m. long. It is 18 m. long and has a width of 1 m. at the entrance, and an extreme width of 10 m. Dangerous shoals obstruct navigation on the W. side.



**Foynes.** Village of co. Limerick, Irish Republic. It lies 24 m. W. of the city of Limerick, at the estuary of the Shannon. Here was established the first eastern base in the British Isles, for flying boats only, for trans-Atlantic flights. It came into use in 1937, first for trials and later for regular services, by British and U.S. aircraft.

It afterwards became part of Shannon airport (Irish Rincanna), the main landplane terminal.

**Fraction** (Lat. *fractio*, from *frangere*, to break). Arithmetical expression of the relation of a part to the whole. The simplest fractions express this relationship where the whole contains the part an exact number of times; e.g. if there are seven equal parts each part is a seventh of the whole. The next step is the adding together of several such simple parts, to form a fraction like three-sevenths.

The handling of such fractions is greatly facilitated by their expression, in the Arabic notation, by two numbers separated by a bar; thus, three-sevenths is written  $\frac{3}{7}$ ; in this expression 3 is called the numerator and 7 the denominator. Such a fraction as  $\frac{3}{7}$  is called a vulgar fraction.

A decimal fraction is one in which the denominator is either ten or a power of ten; and such a denominator is understood to exist when a figure, or a group of figures, is preceded by what is termed a decimal point: thus .39 is interpreted to mean  $\frac{39}{100}$ . The decimal system affords great advantage in the comparison of fractions with different denominators (e.g. it is not immediately obvious that  $\frac{7}{11}$  is greater than  $\frac{2}{3}$ , but when expressed decimally as .636... and .625 respectively, the fact is at once evident), and in computations where exact accuracy is not required; but it has the disadvantage of being cumbersome for the exact expression of some of the commonest fractions, e.g. one-third, which is expressed as .3 (i.e. .3 recurring), one-eleventh .09, one-seventh .12857.

**Fractionation.** The process in chemistry of separating into fractions mixtures whose components differ in such details as boiling point, rate of crystallisation, solubility, precipitation, sublimation, combustion diffusion. Fractionation is more difficult the closer the properties of the substances to be separated; an extreme case is the separation of isotopes (q.v.).

**Fractionating Column.** Chemical apparatus used in distillation. Of three main laboratory types, the dephlegmator type is most widely used. In this the ascending vapour from the still bubbles through the vapour that is already condensed. Thus intimacy of contact between vapour and liquid increases the efficiency of separation. A fractionating column used for separating nitrogen and oxygen from liquid air consists of a series of trays, their temperatures ranging from  $-196^{\circ}\text{C}$ . (top) to  $-183^{\circ}\text{C}$ . (bottom). At each temperature when vapour and liquid are in equilibrium, the vapour is richer in nitrogen, the liquid in oxygen. Overflow pipes from each tray lead to the tray below, so that the successive downward overflows become progressively richer in oxygen; while holes in the floor of each tray allow the vapour to rise from the tray below, so that the upward-passing vapour becomes progressively richer in nitrogen. See Distillation.

**Fracture** (Lat. *fractura*). Word meaning breakage, but specially applied to breakages of the bones. These are usually caused by external violence, which may be direct or indirect. A fracture caused by direct violence occurs at that part of the bone lying beneath the tissues which are actually struck. Indirect violence breaks the bone at some other part. A blow on the side of the chest will break the ribs at the spot actually struck and drive the fractured ends inwards; but if a cartwheel passes over the chest of a person lying on his back on the ground, the ribs break by indirect violence at the point of maximum curvature, and the fractured ends tend to turn outwards. Powerful muscular effort sometimes causes fracture.

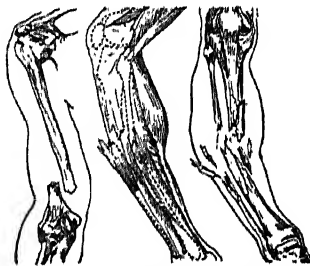
Conditions predisposing to fracture are diseases which cause atrophy or weakness of the bones,

such as rickets. In certain forms of lunacy the bones may be so weakened as to fracture from a slight effort or accident, a condition which has several times given rise to groundless accusations of ill-treatment. In a simple fracture there is no communication between the seat of fracture and the external air; in a compound fracture the skin or mucous membrane is so torn or injured as to bring about this communication. In a comminuted fracture the bone is broken into more than two pieces, and in an impacted fracture the ends of the bones are driven into each other. A fracture which does not completely break the bone, but bends and splits it, is termed a green-stick fracture, and is most often seen in young children whose bones are relatively soft. A fracture of the skull which has resulted in the driving in of a piece of bone is a depressed fracture.

The general treatment of a fracture consists in first setting the broken bone, i.e. bringing the broken ends into opposition with each other in the normal position. This is done by manipulation, and as the process may be painful, and muscular spasm may hinder the replacement, it is usually desirable to place the patient under an anaesthetic. The broken bone is next secured in normal position by means of bandages, splints, and perhaps plaster of Paris. The limb must be kept at rest while reunion is occurring, but as disuse leads to considerable weakening and atrophy of the muscles, the limb should be massaged daily. Gentle passive movements of the limb are also begun early in order to prevent contraction of the ligaments and stiffness in the joints.

With single fractures in which the bones are readily maintained in good position, these methods are usually sufficient, but for more complicated fractures, operative measures are often desirable, the fragments of bone being bound together by silver wire or, in appropriate cases, united by metal plates. Compound fractures demand thorough cleaning of the injured tissues and removal of all loose fragments of bone, which are apt to undergo necrosis if left in the wound. If suppuration has occurred, the insertion of drainage tubes is generally necessary. Plating or wiring is not as a rule desirable in such cases. See Bone: First Aid; Surgery.

**Fracture.** Metallurgical term. When a piece of metal is broken, in use or in testing, the surface of



**Fracture.** Three types of this bone injury. 1. Simple fracture of the humerus. 2. Compound: skin torn by fractured leg bones. 3. Comminuted and compound: splintered bones in leg fracture

the break is seen to be irregular. Examination of numerous fractures of different metals shows many different types. An experienced metallurgist can very often determine the cause of a failure from the appearance of the fractured surface. A coarse, crystalline fracture often indicates that the metal has been overheated during annealing or casting, while a fibrous character may be due to the presence of slag. Other types show silky, vitreous, or granular fractures. Failure from fatigue (*q.v.*) gives a fractured surface with two distinct areas, one smooth and one granular. *See* Detector.

**Fra Diavolo** (1771-1806). Nickname of Michele Pezza, an Italian brigand. Originally a monk, he became an outlaw chieftain in the mountains of Calabria, where his atrocities earned him his nickname (Brother Devil). Ferdinand of Naples made him a colonel, and with Cardinal Ruffo he raised a revolt against the French in 1799. In 1806 he made a similar attempt but was caught and hanged in Naples as a bandit, Nov. 10.

**Fra Diavolo.** Opera by D. F. Auber, nominally founded on the misdeeds of the brigand of that name. The full title of the opera is *Fra Diavolo, ou l'Hôtellerie de Terracine*; the libretto was by Scribe; and it was first performed at the Opéra Comique, Paris, Jan. 28, 1830.



Fragonard. *The Swing*, one of the artist's most delicately executed masterpieces, painted about 1768  
Wallace Collection, London



J. H. Fragonard,  
French painter  
After Gérard

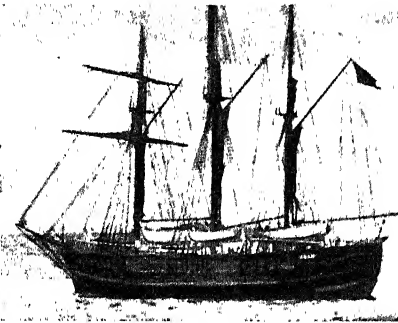
won the Grand Prix in 1752 at Rome, in 1763 he returned to Paris, was received into the Academy in 1765, and shortly afterwards abandoned classical painting for the freer style appreciated by the court, portraying scenes of pleasure and voluptuousness. During the Revolution he retired to Grasse, where he completed the five paintings of *The Lover's Progress*, now in the Pierpoint Morgan collection and exhibited at the Guildhall in 1902. He returned to a changed Paris, and died there poor and neglected, Aug. 2, 1806. Apart from the Grasse pictures, his most famous works are in the Louvre and the Wallace Collection: *Coreus and Callirrhoe*, *The Music Lesson*, and *The Storm*, in the Louvre, and *The Swing*, in the Wallace Collection. His crayons and water colours are charmingly facile.

**Fram** (Norwegian, forward). Three-masted schooner of 402 tons built in 1892 for Nansen's Arctic expedition. She was 117 ft. in length, with triple external planking ranging from 24 ins. to 28 ins. in thickness, and auxiliary engines driving a screw propeller. Nansen sailed in her in 1893, and entering the ice at the New Siberia Islands, drifted northward. In 1895 he left the ship and marched N. as far as lat. 86° 13' 6". In 1897 he fell in with the Jackson-Harmsworth expedition, with whom he returned in the *Windward* to Norway, whither the *Fram* also returned

**Fragonard,** JEAN HONORÉ (1732 - 1806). French painter and engraver. Born at Grasse, in Provence, April 5, 1732, he studied under Boucher and Chardin and, having

safely. In 1899 the ship was used by Sverdrup in his exploration of Jones Sound, in the N. of Baffin Bay.

In 1910 Roald Amundsen (*q.v.*) left Norway in the *Fram*, intending, like Nansen, to drift across the North Polar basin, but, changing his programme, made his way to Madeira and the Antarctic regions. The ship was next heard of in the Bay of Whales, where R. F. Scott discovered her while cruising along the Ice Barrier. Amundsen wintered near King Edward VII Land, and having accomplished his march to the South Pole, rejoined



*Fram*. The polar exploration ship after she had been converted from steam to oil for Amundsen's expedition in 1910

the *Fram*, arriving at Hobart, Tasmania, March 7, 1912, and later returning to Norway. *See* Nansen.

**Framboesia** or **YAWS** (Fr. *framboise*, raspberry). Infectious and contagious disease caused by a minute spiral-shaped organism, *Treponema pertenue*, discovered by Castellani in 1905. The disease is almost confined to tropical and sub-tropical regions, being most prevalent on the W. coast of Africa, in Tripoli, the Malay Peninsula, Assam, Java, Ceylon, the West Indies, Samoa, and Fiji.

**Frame.** Term used in building. Almost every building must of necessity be constructed as an "unclothed" frame, or a "clothed" frame or on massive (monolithic) principles. Typical unclothed frames are steel girder bridges and latticed steel towers carrying high tension cables. Clothed frames in large buildings consist of steel or reinforced concrete skeletons around which brickwork, concrete, or masonry forms the walls and floors. Prefabricated houses are also usually built on the clothed frame principle. Typical "mass" buildings are cathedrals, masonry arch bridges, dams, and brick houses.

The purpose of a frame is to support the weight of a structure



and all superimposed loads applied to it, including the weight of people, materials, machinery, or vehicles, and externally applied forces such as the tension in overhead cables, wind and snow loads; and to assist in transferring these forces to the foundation (*q.v.*).

Plane frames are those such as bridge girders and roof trusses which are built in a flat plane. They usually consist of a series of rigid triangles, so enabling applied forces to be resisted without use of unnecessary materials. The joints may be made of large single bolts (pin-jointed frames) or by riveting or welding. Lattice towers are constructed as space frames in which the essential element is a pyramid comprising four triangles. These can resist forces from any direction.

The steel and reinforced concrete skeletons used in building construction are usually incomplete frames, built up of a series of rectangles in two directions at right angles to each other. As a pin-jointed rectangle is unable to resist without distortion the application of a force at any corner, the joints must be rigidly constructed, by riveting or welding, to provide the necessary stability against lateral forces.

**Framework Knitters' Company.** London city livery company. It came into existence with the invention of silk stockings, and was granted its first charter by Cromwell in 1657. A second charter was granted by Charles II in 1663 to "the wardens, assistants and society of the art and mystery of Framework Knitters in the cities of London and Westminster, the kingdom of England, and the dominion of Wales." The powers were limited by parliament in 1753, the hall in Red Cross Street, E.C., was sold in 1821, and the plate in 1861, the proceeds being devoted to the Bourne almshouses in Kingsland Road. Corporate income, £310; trust income, £352;



Framework Knitters' Company arms

offices, 3, Albany Court Yard, Piccadilly, W.1. Consult The Framework Knitters, H. C. Overall, 1879.

**Framlingham.** Market town of Suffolk, England. It has a railway station, 19 m. N.E. of Ipswich and 90 m. N.E. of London. S. Michael's church, with a tower 95 ft. high, contains tombs

of some of the Howards, including that of the earl of Surrey, the poet. The castle is a fine ruin. The remains include a gateway, the outer walls, 13 towers, and a moat; it was the stronghold of the Bigods, and later of the Howards, both families in turn holding the earldom of Norfolk, in the lands of which the castle and dependencies lay.

Framlingham College is a public school for about 280 boys. Built to commemorate the Prince Consort, it was opened in 1865 as the Albert Memorial College. In 1947 Brandeston Hall (16th century, rebuilt 1854) was bought for housing a junior school. Framlingham is an old place, having existed before Roger Bigod built a castle here about 1100. Its history is really that of the castle, which was more than once forfeited by the Howards, but restored to them. They lost it finally in the 17th century. Market day, Sat. Pop. 2,101.

**Frampton, Sir George James** (1866-1928). British sculptor. He studied under W. P. Frith, and at the R.A. schools; later, under P. Mercié and Dagnan-Bouveret in Paris. He first exhibited at the R.A. in 1884, was elected A.R.A. 1894, and R.A. 1902, and knighted in 1908. As a decorative sculptor he is in the front rank, excelling in polychromatic figure work and architectural skill. Among his works are the bronze memorial to Charles Mitchell, 1898; S. George, 1899; statues of Queen Victoria, Calcutta and Delhi; Peter Pan, in Kensington Gardens; the lions at the British Museum; and the Edith Cavell memorial. He died May 21, 1928. His son Meredith Frampton (b. 1894) was elected R.A. 1942.



Sir George Frampton, British sculptor

**Franc.** The unit of the French decimal monetary system. The name comes from the inscription Francorum Rex, king of the Franks, on the obverse of the gold coin issued by John II in 1360.



Framlingham, Suffolk. Walls of the ruined castle, with the workhouse built when the castle was dismantled in the 17th century  
Frith

It was then the equivalent of the livre, and consisted of 20 sols. Gold francs were also coined by Charles V of France, and in 1575 Henry III issued silver francs. In 1641 Louis XIII substituted the silver louis, but the name of the franc survived the actual coin and was long synonymous with the livre. In 1795 the franc was again established, superseding the livre, and, consisting of 100 centimes, is the unit of French currency.

A coin of the same name is current in Switzerland; it also is divided into 100 centimes. Belgium formerly adhered to the franc as a currency unit, but in 1926 abandoned it in favour of the belga, value 5 francs. Changes in the Second Great War led to the substitution of cheaper metals and of paper for the silver coinage, and after the 1949 devaluation of currencies the British pound sterling equalled officially 980 French francs, 12-24 Swiss francs, and 140 Belgian francs, i.e. 28 belgas. The Belgian rate was still always quoted in francs.

**Français, François Louis** (1814-97). French painter. Born at Plombières, Vosges, Nov. 17, 1814, he studied art under Corot and Jean Gigoux. Among his works are *A Song* under the Willows, with figures by Baron; *In the Park of St. Cloud*, with figures by Meissonier; *An Italian Sunset*, in the Luxembourg; and decorations in the Church of the Trinity. He died May 28, 1897.

**Francatelli, Charles Elmé** (1805-76). British cook. Born in London of Italian parentage, Francatelli became, in turn, cook to several noble men, to Crockford's Club, and to Queen Victoria. His fame as a cook of the highest skill was widespread, and he published *The Modern Cook*, 1845; *The Plain Cookery Book for the Working Classes*, 1861. Died Aug. 10, 1876.

# FRANCE: THE COUNTRY AND ITS CULTURE

E. STERN-RUBARTH, Ph.D., GUSTAVE COHEN, *Professeur-en-Sorbonne*; and Others

*This article covers in brief the geography, industry, art, literature, and history of France. A separate section is devoted to her history during and after the Second Great War. See also D-day; Europe, Liberation of; First Great War; France, Battle of; Napoleonic Campaigns, etc.*

France is the largest and, in natural resources, the richest country of western Europe. Its area is 212,737 sq. m. By the First Great War France won back from Germany the 5,600 sq. m. of Alsace-Lorraine, lost in 1870. With the



France. Arms of the Republic

English Channel to the N., the Atlantic to the W., and the Mediterranean to the S., with the protection of the Vosges and Alps along more than half of her E. border, and of the Pyrenees in the W. half of her southern frontier, and with her almost quadrangular shape, France is an extremely well balanced geographical and political unit. She possesses, too, many navigable rivers leading to good harbours, and vast fertile plains.

Her economic life is based on agriculture; but her wealth, though much affected by war, political upheaval, and long periods of internal conflict, has assisted the acquisition of a vast colonial empire and the development of a refined civilization which, in turn, has favoured the growth of profitable luxury trades and specialised industries. The savings of her thrifty population long made French capital of world importance in international loans and investments; and though the First Great War heavily taxed her manpower and her resources, and left her financial position unbalanced, France was approaching recovery when overwhelmed by the Second Great War, defeat, and occupation.

## Roads, Canals, and Railways

Most of the excellent roads—constructed in the main for Napoleon's military needs—and waterways, including a widespread canal system, are in the hands of the state, which created a body of civil service engineers for their maintenance. The railways, badly damaged during the Second Great War and mainly privately owned, were greatly improved and progressively electrified after it. The magnificent natural ports, many virtually destroyed, were rebuilt and their facilities improved. In their geographical order, starting from the Belgian border, the chief ports are: Le Havre at the mouth of the Seine, Cherbourg, Brest, St. Nazaire at

the mouth of the Loire, La Rochelle, Bordeaux on the Garonne, Marseilles, and Toulon. The main canals link the Rhine with the Saône, Rhône, and Marne; the Seine with the Loire; the Loire with the Saône; and the Garonne, flowing into the Atlantic, with the Mediterranean.

## Navigable Rivers

With a length of 620 m., the Loire is France's longest river, navigable for almost its whole length. Next in length comes the Rhône, 507 m. long and navigable for some 300 m. The Seine, with a length of 485 m., is navigable for three-quarters of its length, and the Garonne, 378 m. long, is navigable up to the Pyrenees range from which it flows. Including the Rhine, which between, roughly, Basel and Lauterbourg is a French river, and the comparatively small but navigable Charente, the chief rivers of France thus number six. Their most important tributaries are the Allier, Vienne, and Sarthe, joining the Loire; the Saône, Isère, and Durance, entering the Rhône; the Marne and Oise, which join the Seine; the Ariège, Tarn, Lot, and Dordogne, which flow into the Garonne or its estuary the Gironde. The Somme in the N.E. and the Adour in the extreme S.W. are small rivers with no tributaries of any importance.

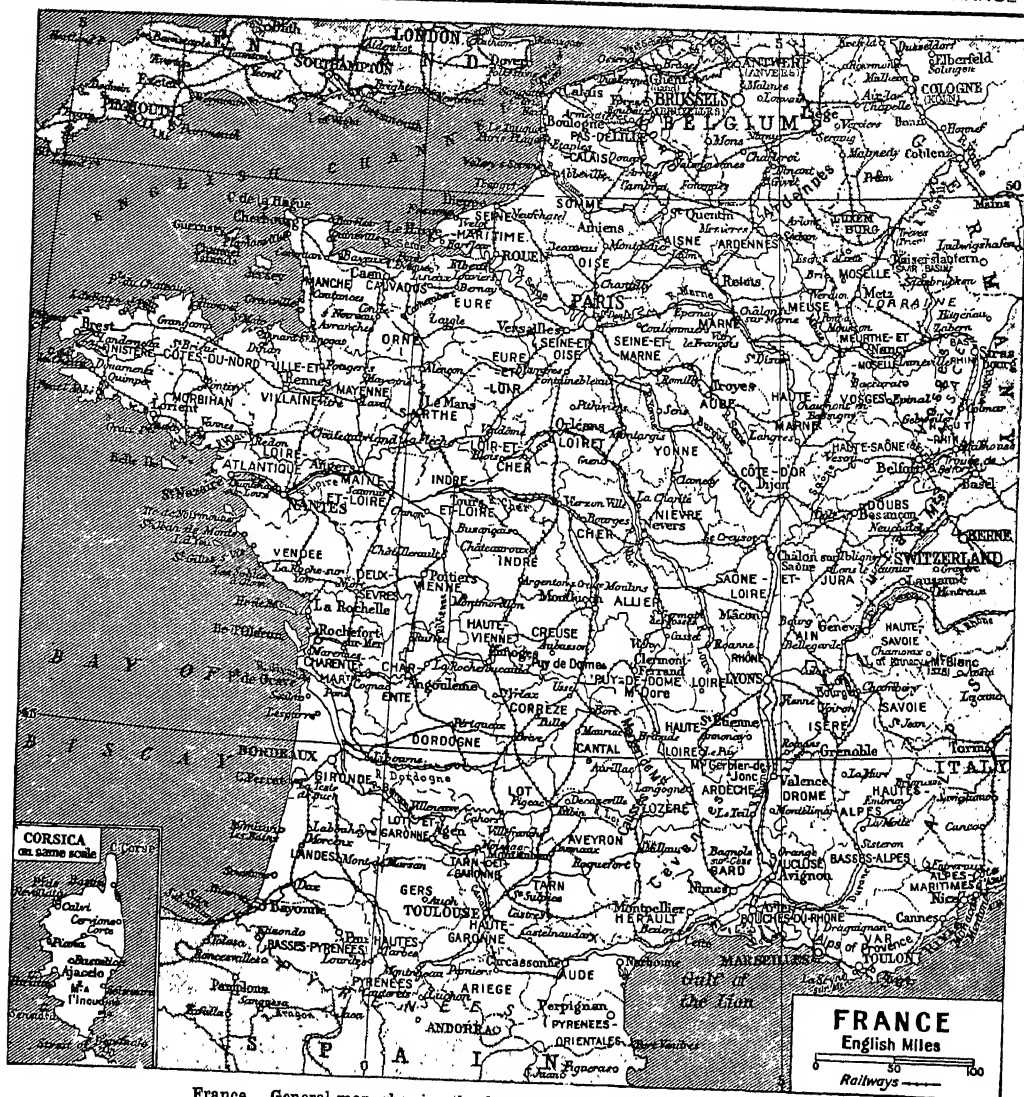
Sea coasts of more than 1,000 m. total length favour deep-sea fishing and attract valuable international tourist traffic. Some of the world's most famous health resorts are found on the French coast, including Trouville and Deauville, in Normandy; St. Malo, Dinard, and Quiberon, in Brittany; Sables d'Olonne, Biarritz, and St. Jean de Luz, on the Bay of Biscay (Côte d'Argent); Cannes, Nice, and Mentone, on the Mediterranean (Côte d'Azur). The main fishing ports are Boulogne, Dieppe, Fécamp. St. Malo, Paimpol, Lorient, La Rochelle, Bayonne, and Cette; fishermen from the N. ports seek herring and mackerel, from St. Malo cod as far as the Newfoundland bank and Iceland, and from the S. ports sardines and tunny; oysters, at Cancale, lobsters, and langoustes are taken in large quantities.

**AGRICULTURE.** The peculiar salty grass along France's N.

shores lends itself to sheep-breeding; there originated the famous *présalé* lamb. But animal husbandry is not otherwise of great importance. Apart from breeds of heavy cart-horses, including Normans and Percherons, draught-oxen, widely used in the S., are the most characteristic product of French breeding. Goats are, in large areas of the mountainous S., an important source of milk, cheese, and meat. Farming in an age of mechanisation is handicapped in general by the strong individualism of the countryfolk and the small size of their holdings. Nearly 40 p.c. of the farms are less than 2½ acres, another 45 p.c. less than 25 acres, while only 0.5 p.c. exceed 250 acres. About 79 p.c. of all the farms are worked by their owners, 13 p.c. by tenants, 8 p.c. by *métayers*, who share their produce with the owners. Large properties, with castles and manors, survive mainly in the rich wine-lands of the W. More than 9 million persons, representing 23 p.c. of the total and 42 p.c. of the working pop., earn their living in agriculture and forestry, as against 7½ millions, or 35.5 p.c. of workers, in industry, transport, etc. Trade, banking, the professions, etc., give work to another 3 millions, or 13.5 p.c., and the remaining 2 millions serve the state, or local administration, or are in the forces. Thus, it is clear, agriculture is by far the leading industry.

## Vineyards and Market Gardens

Wheat is the chief crop, averaging about 9 million tons a year; all other grains together yield about another 9 million tons; sugar beet comes to about 7 million tons, and potatoes to between 14 and 18 million tons. The vineyards, which in such regions as the Gironde, Champagne, Burgundy, etc., are of primary importance, vary greatly in quantity of production, yielding between 600 and 1,800 million gallons of wine, of which up to 95 p.c. is consumed by the French. The havoc wrought by the phylloxera epidemic was largely overcome by grafting Californian vines upon affected French plants. Fruit growing, and the production of cider, form another important branch of French agriculture, the latter especially in Normandy. Peaches



nuts, almonds, cantaloupes, figs, oranges, and lemons grow in the sunny S., plums, cherries, and apricots everywhere. The culture of mushrooms, truffles in Périgord, mustard near Dijon, onions in Brittany, asparagus, beans, and other early vegetables, flowers for export and scent manufacture, olives for oil and soap making, and mulberry trees for silkworm rearing, indicates the extent of the highly developed French market gardening.

**INDUSTRY.** With her recovery after the First Great War of the iron ore mines and iron and steel works of the Lorraine basin, France became the European country richest in industrial raw

materials. Though her capacity was never fully exploited, she produced between 5 and 10 million tons of pig-iron and about the same of steel per year and, from being the fourth (after the U.S.A., Germany, and Great Britain), became the third of the world's iron and steel producers. Her coal production, however, was insufficient for her new industrial capacity; from a peak of nearly 60 million it fell to about 46 million tons in the early 1930s. Industries relying upon these basic materials were unequally developed; the motor industry, electrical engineering, and bridge building were highly developed, while others were comparatively

backward. The French do not readily take to mass production, but excel in individual creative work, frequently leading in industrial innovation, as in motoring and aeronautics, but seldom keeping the lead.

For high finish and artistic taste French products are outstanding, e.g. fine textiles, especially silk, and women's wear—dresses, hats, bags, shoes, and accessories. While Lyons is the centre of the silk industry, the finished products bear the stamp of Paris, the fashion centre; perfumes come from Paris, and from Grasse in Provence, where flower growing and the distilling of scents is an old established craft.



France. Map showing the main railway lines and the principal canals

Other regions contributing to the luxury trade are Valenciennes and Le Puy with lace, Roubaix and Tourcoing with fine woollen cloth, Troyes with hats and hosiery, and St. Etienne with its well known velours and ribbons.

Further industries of specific character are cut glass at Baccarat, porcelain at Limoges and Sèvres, carpets and tapestries, the Gobelin and Savonnerie at Arras and Tournai, and the widespread gold, silver, and jewelry industries. Foodstuffs particularly associated with France include truffled goose-liver paste, produced in Strasbourg and Périgord; chocolates and sweets from Paris; Roquefort, Camembert, Brie, and Pont l'Évêque cheeses; Reims and Commercys biscuits; Bénédictine, Chartreuse, and Grand Marnier liqueurs, as well as many Champagne and brandy products known internationally. Watch-making in the Jura mountains, adjacent to the Swiss centre of that industry, has reached a high standard. French foreign trade in general is fostered by a highly developed system of chambers of commerce, with honorary commercial councillors everywhere; until the Second Great War regular fairs were held several times a year, notably at such places as Lyons, Paris, and Bordeaux.

**COMMUNICATIONS.** Except for the massif just S. of the centre of France—consisting of the Cévennes, Auvergne, Mont Doré, Puy-de-Dôme, and Causses mountains, with heights up to 6,300 ft.—the country is mainly flat and therefore easily provided with good communications; nevertheless, its thinly spread population and its high degree of centralisation have prevented the development of a perfect railway system. Though more than twice the size of Great Britain, France, with between 38,000 and 39,000 m. of rly. (including 30 p.c. local lines) exceeds the British mileage by less than 60 p.c. She early developed, however, a full road transport system and made good use of her rivers and 3,600 m. of well-kept canals for heavy transport. Favoured by the great resources of water power in the Alps, Pyrenees, etc., France began rly. electrification shortly after the First Great War, and until about 1930 her air lines were credited with the greatest length of miles flown, and the greatest weight of freight carried in any part of Europe.

**POPULATION.** The total population of France remained virtually unchanged at about 40 millions from 1900 onwards, the surplus of births over deaths

being between nil and 0.13 p.c. By the Second Great War a slight increase of up to 2 millions had been recorded; this was the result of increased immigration.

#### Homogeneous Population

Non-naturalised foreigners represented 2.8 p.c. of the pop. in 1910, 6.1 p.c. in 1926, nearly 8 p.c. before the Second Great War, but only 3.4 p.c. in the census of 1954—1,452,000 out of a total pop. of 42,734,445. The French population proper is today comparatively homogeneous, descended from an early mixture of Nordic, Mediterranean, and Alpine peoples, of Celts, Latins, Germans, and Iberians. There are small remnants of Germanic origin in Flanders, a million Bretons in Brittany, Italians in Corsica and on the Riviera, and the Basques, an indigenous Iberian people with a language and customs of its own, in the W. Pyrenees and on the Bay of Biscay. The Alsatians, who speak a dialect of German, are a distinct but loyal section of the French people; as are the small remnant of pure Celts surviving in the central plateau. An essentially rural character of France appears in the facts that France, at the census of 1954, had only 24 towns of more than 100,000 inhabitants, as against Great Britain's 60; that only 17 p.c. of the French people lived in these larger towns, as against 45 p.c. in Great Britain; and that nearly half the people lived in parishes of fewer than 2,000 inhabitants.

**CONSTITUTION AND GOVERNMENT.** The constitutional laws of the Third Republic, promulgated in 1875, and revised in 1879, 1884, 1919, and 1926, distributed the executive power between the president, the senate, and the chamber of deputies, fixed the electoral age at 21, and, after 1919, required that elections be held under a system of proportional representation, later abandoned in favour once more of simple majorities. Following the liberation in 1945, a new constitution was elaborated and, in Oct., 1946, accepted by a majority in a special referendum, about one-third of the electorate abstaining from voting.

#### The Fourth Republic

In its preamble this constitution of the Fourth Republic established equal rights for women; the right of asylum for political and other refugees; the duty and the right of work for all; no discrimination for reasons of origin.

opinion, or belief; confirmation of trade union rights; the right to strike, within the legal framework; nationalisation of public services and monopolies; health and old age insurance as a national task; equality of education by the state; adherence to international laws and reciprocity in limiting sovereignty for the defence of peace; and the unity of all French people, overseas or metropolitan, without racial or religious discrimination. It provided for the settlement of constitutional matters by referendum and of all others by the deputies, who were elected by equal, direct, secret, and universal suffrage.

Under the 1946 constitution, parliament consisted of the national assembly, equivalent to the former chamber of deputies, and the council of the republic, replacing, with much reduced powers, the former senate. While the former was elected on a basis of proportional representation by secret, direct, universal suffrage, the council was indirectly elected by (a) communal and departmental councils, and (b) as to one-sixth of its numbers by the national assembly itself. It could only give advice and pronounce upon bills and propositions presented by the assembly; laws were made by the assembly alone. There was also an economic council.

#### Administration of Government

The president was elected by parliament for seven years, and was merely representative, but had the right to refer laws back to parliament. Many functions previously held by the president were vested in the prime minister. New constitutional articles provided that a vote of no confidence could be made only by a majority of all deputies, and by way of safeguard against the former frequent changes of government, that the cabinet could dissolve the assembly in the event of two crises arising within 18 months. A high court of justice was elected by the assembly at the beginning of each legislature. The constitution also provided for the French Union, a new imperial parliament, which served to bind France and her overseas territories, and other parts of territories or associated states, by a special citizenship, assembly, etc., under the president. There was a special court of magistrature of 14 members, under the president, and there were articles providing for revision of the constitution, etc. Some modifications were made by an amending law of 1954.



France. Map indicating the areas devoted to the chief products and industries

The long-established system of administration remained on the whole unaltered. Each of the 90 departments had a prefect, selected by the minister of the Interior and appointed by the president; he was head of the government authorities in his area and chairman of an elected council. Each department was sub-divided into *arrondissements*, under sub-prefects assisted by elected advisory councils. Thus the whole administrative machinery was under the authority of the cabinet. The administration of the local units (*communes*) was, however, entirely elected and self-governing, with authority within the town or borough area, inclusive of local police except for Paris and Lyons where the police were under government appointed prefects. Since many decisions of the municipal council and its elected chairman, the mayor, might affect outside interests, they were subject to approval by the prefect, who, in turn, might refer decision to higher authority. The administration was thus centralised in Paris; yet, handled with care and tact by well trained and expert officials, it worked smoothly and satisfactorily on the whole, without depriving the citizens of their interest and active participation in public affairs.

**RELIGION AND EDUCATION.** In consequence of the Combes-Briand laws which separated church and state in 1905, all religious denominations possess equal rights and none enjoys any state support. The large majority of the nation adheres to the R.C. Church which has 17 archbishoprics and two "exempt" bishoprics in metropolitan France, and two archbishoprics overseas, one at Algiers, and a second at Carthago. The Protestants, numbering about one million, belong, so far as they are organized, to three reformed groups with, respectively, 411, 270, and 56 parishes. The Paris faculty of theology belongs to them in common. There are also several hundred thousand Jews and Mahomedans, the latter mostly N. African and other colonial subjects settled in France after their term of military service.

#### Church and State in Education

The numbers and the importance of religious orders have been much reduced by emigration after their expropriation in 1905. On the other hand, the R.C. Church continues to maintain five academies, at Paris, Lyons, Lille, Toulouse, and Angers. They have the standing of *écoles libres* of which several others, of a secular character, enjoy great reputation as complementary institutions for

special studies on the highest plane. Education was for a time, especially during the struggle for the separation of church and state, a source of conflict, although the complete authority of the state in this respect had been established during the French revolution and ratified by Napoleon. Free, obligatory, non-religious primary education was introduced in 1882; a state monopoly, proposed in 1905, was not accepted. Before the Second Great War an average of 3.5 million pupils attended the state primary schools, while slightly over 800,000 were educated at free religious primary schools, financially supported by fees and by church organizations. Secondary and public schools, known as *lycée* if state-owned, and *collège* if under local authority, and partly clerical institutions, have together between 150,000 and 200,000 pupils, one-third of them girls.

#### Training of School Teachers

There is an elaborate system of state-owned *écoles normales* and *écoles nationales* for the training of future teachers, state engineers, professional officers, etc., linked with the 17 state-owned universities, of which the Paris Sorbonne with 40 p.c. of all French students is the chief. Other institutions are the *École pratique des hautes-études*, teaching the methods of scientific work, the *École des chartes*, for librarians, etc., the *École des langues orientales*, and the famous *Collège de France*. The intellectual leaders of France are assembled in the *Institut de France*, dating back to 1634 and comprising the five *Académies*—*Française*, *des Inscriptions et Belles-Lettres*, *des Sciences Morales et Politiques*, *des Sciences*, and *des Beaux-Arts*, with 40 members each, except the *Académie des Sciences* which has 66 members.

#### NEWSPAPERS AND PERIODICALS.

France has had newspapers since the surgeon Théophraste Renaudot in 1631 created the weekly *Gazette*. A daily *Journal de Paris* began in 1777. Before the Second Great War, about 6,000 daily, weekly, and other newspapers were published, some, like the *Petit Parisien*, the *Paris Soir*, and the *Journal*, with circulation figures of over a million. Newspapers devoted to a party or a particular trend of opinion had much smaller circulations, though some enjoyed international fame; they included *Le Temps*, *Le Figaro*, *L'Écho de Paris*, *L'Œuvre*. Most of them ceased during the

Second Great War: others were suppressed after it in consequence of collaboration with the enemy. Some reappeared after it under a different title and management; thus *Le Monde* took the place of *Le Temps*. Others which had not collaborated came out again under their old names, e.g. *Le Figaro*. There are also important provincial papers, in Lyons, Marseilles, Toulouse, Bordeaux, etc. *La Revue des deux Mondes*, *Revue de Paris*, *Le Mercure de France*, and other monthlies and weeklies gained international reputations. Journalism was always one of the professions leading to political success in France, and many statesmen and intellectual leaders began as journalists.

**LEGAL SYSTEM.** The administration of justice was laid down in the Code Napoléon. This separates criminal from civil jurisdiction, but both are administered by courts at three levels—the courts of assizes, of appeal, and of *cassation*. Minor criminal offences are dealt with at police courts and correctional tribunals, small civil cases come before commercial tribunals (of three business men) and justices of the peace. For disputes between employers and employees, courts of *prud'hommes* (experts) are held. Appeals to the court of *cassation* (*q.v.*) are allowed on legal points only, and are previously examined by a *chambre des requêtes*. In criminal law, the examining magistrate, *juge d'instruction*, plays an important part; he has to do his utmost to induce the accused to confess, but can release him on his own authority if the evidence against him seems insufficient.

#### The Public Prosecutor

The public prosecutor, who takes the place of a prosecuting counsel, is a state official called *procureur de la république* and can, in order to enforce observation of the law, intervene in civil suits. Both counsel attempt to influence the emotions of jurors, judges, and public by oratory; the judges themselves are not presumed to act as impartial referees, but assume the guilt of a prisoner, the examining magistrate having provided an indictment. Women have been admitted to the bar for many years. The prison system has undergone several reforms since the 19th century, and the penalty of deportation was finally abolished in 1938.

**SOCIAL INSTITUTIONS.** France has an obligatory old age insurance paid for by employers, employees,

and the state; insurance against invalidity, enforced since 1910; sickness insurance; and a free old age, sickness, and invalidity provision paid for by state department and local authorities under a law of 1905 for the poorest people. There are government welfare offices and, since 1913, allowances for mothers with children, with premiums for families of four and more children.

#### Military Service

The first French law for the protection of children was passed in 1873. Special advantages are granted on public transport services for families with children, cripples, and war victims. Military service is universal and compulsory. Reforms of 1927 reduced the term of service from 1½ years to one year—later increased again to 1½ years; introduced a three-year period of *disponibilité* (availability) during which trained soldiers could be called up by simple order at any time; and established a period of 16 years in the first and another 8 years in the second reserve. They also provided for a complete mobilisation of national resources and every citizen irrespective of sex or age, and for an army of up to 750,000 coloured subjects in case of war. The potential in manpower of France was then estimated at 8,000,000 men in the fighting forces.

After the Second Great War the period of conscription remained 18 months, and in 1953 the army consisted of 565,000, the air force of 117,000 officers and men. The navy, manned chiefly by volunteers, in 1956 numbered 67,935.

**OVERSEAS EMPIRE.** In 1939 the French overseas empire (*see table in opposite page*) was second in extent only to the British. It dated back to the 16th century when Rio de Janeiro, 1555-66; parts of Florida, 1562-67; and New France (Canada), from 1604, were occupied. In the 17th and 18th centuries it included what became Louisiana and other southern areas of the U.S.A.; and large territories in India. Except for St. Pierre and Miquelon, and 196 sq. m. in India, all these were lost; but by 1939 France had built up a new empire.

Syria and Lebanon were granted independence during the Second Great War. The constitution of 1946 fundamentally revised the relationship between France and its colonies by creating the French Union (*q.v.*). Independence was accorded in 1954 to the countries



of Indo-China, in 1956 to Tunisia and Morocco. France's remaining Indian possessions were ceded to the republic of India in 1954. (For more information, *see under* the entries for the separate lands listed in the table.)

**HISTORY.** Though generally described as a Latin nation, France is Latin only in so far as it took the base elements of its civilization—its language and its original administration—from the Romans. In fact, its inhabitants are of heterogeneous origin. Westward movements of peoples in Europe are discernible all through the prehistoric period, and each migration made its contribution to the population of what is now France, mingling with the old stock descended from Palaeolithic and Neolithic man. The Celtic tribes dominating the territory when recorded history begins arrived during the 5th and succeeding centuries B.C. In the south-east a Ligurian element predominated; in the south-west the Aquitani, of Iberian stock. In the north were Belgic tribes. These peoples were numerous, with well developed agriculture and trade, and well defended tribal capitals. On the south coast were the Greek colony Massilia (Marseilles), founded c. 600 B.C., and its daughter cities, e.g. Nicaea (Nice).

The Romans conquered the south of Gaul c. 120 B.C. and organized it as a Roman province (hence the name Provence). The rest of the country was subjugated by Julius Caesar during 58–50 B.C. Germanic tribes (Franks and Alemanni) began to raid Gaul during the 3rd century A.D., and in the 5th century Franks, Visigoths, and Burgundians gained a footing within the country; while Britons fleeing from the Saxons settled in the district now called Brittany. Eventually the Franks gained the upper hand, and with the victories of Clovis, 486, the Merovingian dynasty inherited virtually the whole of Roman Gaul. It ruled until the 8th century, then was replaced by the hereditary mayors of the palace—the Carolingians, named after Charles Martel, the victor at Tours and Poitiers over the Arabs.

Charles's son Pepin and grandson Charlemagne (742–814) made the Frankish empire the greatest power of the time. By strengthening the authority of the pope, whose spiritual supremacy Charlemagne emphasised by having himself in 800 crowned emperor at St Peter's in Rome: by forcing

## FRENCH EMPIRE AT ITS GREATEST EXTENT, 1899

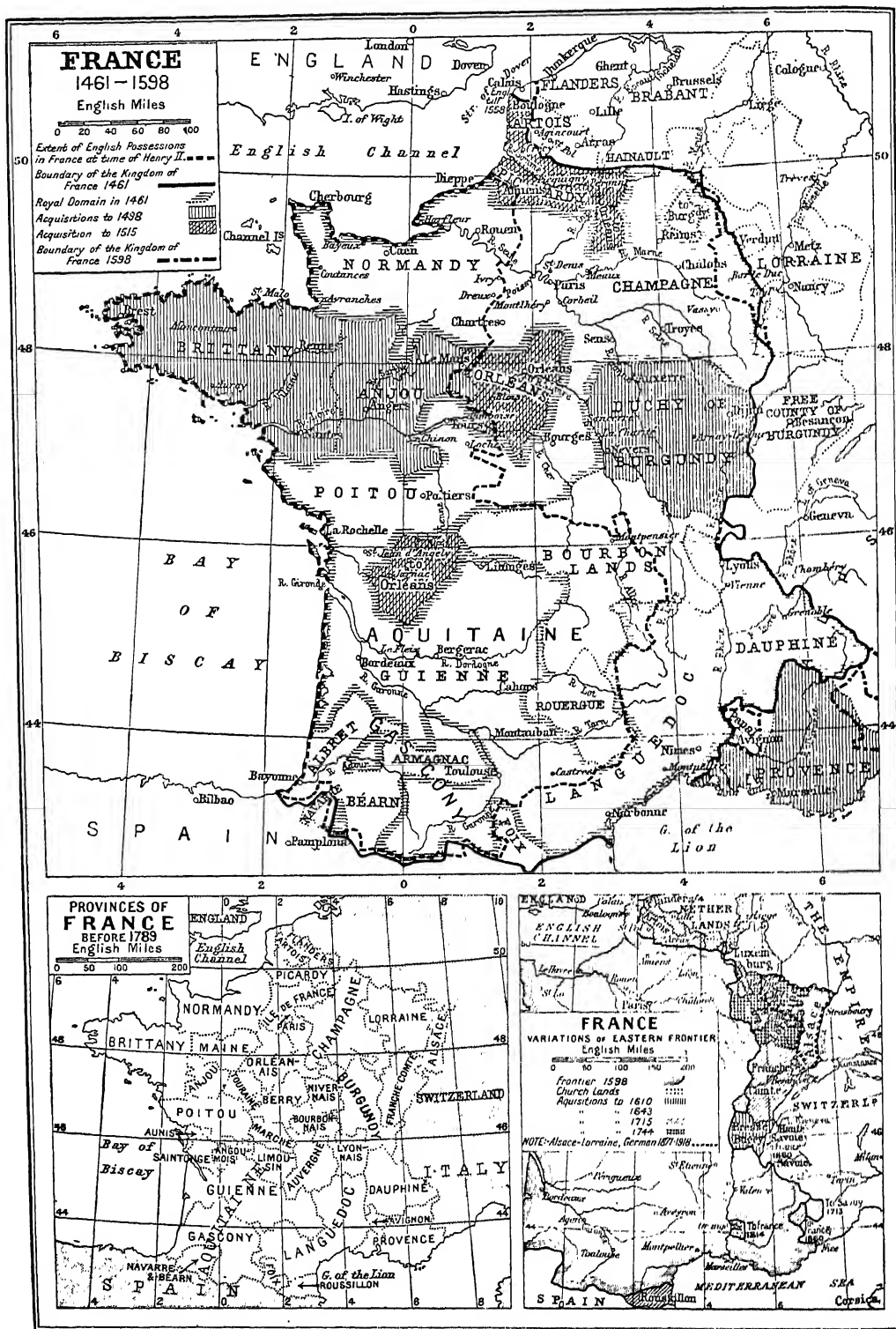
	Date of Acquisition	Area in sq. m.	Pop. (1939 est.)
Algeria (governed by the ministry of the Interior)	1830–1902	847,500	7,235,000
Tunisia	1881	48,300	2,610,000
Morocco	1881	162,120	6,243,000
Syria and Lebanon	1922	57,900	3,630,000
Togo	1922	21,900	737,000
Cameroons	1922	168,500	2,510,000
COLONIES UNDER A GOVERNOR-GENERAL			
French West Africa:			
Sénégal	1637–1889	77,730	1,666,000
Mauritania	1903	323,310	370,700
French Sudan	1893	590,000	3,635,000
French Guinea	1843	89,400	2,066,000
Ivory Coast	1843	180,000	3,981,500
Dahomé	1894	44,700	1,289,000
Niger	1912	499,410	1,810,000
Dakar and Dependencies	1862	60	127,000
French Equatorial Africa			
Gabun		103,000	408,500
Middle Congo		166,100	744,500
Ubangi-Shari		238,800	833,000
Chad		461,200	1,432,000
Madagascar and Dependencies	c. 1700–1896	241,100	3,798,000
Indo-China:			
Cochin-China	1862	26,500	4,616,000
Annam	1884	57,000	6,000,000
Tongking	1884	40,530	8,970,000
Cambodia	1863	70,000	3,046,000
Laos	1893	91,400	1,011,700
COLONIES WITH AUTONOMOUS GOVERNMENT			
Somali Coast	1864	8,490	44,240
Réunion	1642	970	208,860
French India	1679	196	295,500
St. Pierre and Miquelon (Canada)	1635	93	4,200
Martinique	1635	385	246,700
Guadeloupe	1635	688	304,240
French Guiana	1626	65,041	37,000
New Caledonia and Dependencies	1853	8,500	53,250
French Establishments in Oceania	1841–81	1,520	43,600
CONDOMINIUM WITH THE U.K.			
New Hebrides	1906	5,700	45,000
Total		4,696,043	70,052,490

Christianity on such parts of his empire as had remained pagan after Christianity spread into Gaul from the 2nd century; and by himself learning to read, write, and speak foreign languages, Charlemagne supported his claim to a universal monarchy. He conquered large areas of Spain, N. Italy, the Saxon regions of Germany; but he ruled his diverse and mainly uncivilized subjects by assimilating their tribal and regional habits and loyalties to the requirements of the state through an ingenious system of instructions, preserved as Charlemagne's "capitularies"; by his demand of a personal oath of fealty and service wherever he visited his vast domains: and by installing gifted or powerful noblemen as his servants.

That system, and the schools created by Charlemagne, became the common foundation of all western state constitutions, with the seigniorial or feudal system based on homage to the king, and the grant of fiefs in exchange for the supply of horses and men for military service. Charlemagne, whose capital was Aix-la-Chapelle

(Aachen), might have secured the permanent unification of Europe, had not his son Louis, following Frankish custom, divided the empire among his three sons. By the treaty of Verdun, 843, Charles II received W. Francia, the territory of present France less a strip left to his elder brother Lothair, which formed part of the region later called Lotharingia (from which came the name Lorraine for an area long in dispute between France and Germany). Charles and his successors had to combat Norman invaders and rebellious noblemen; one of these, in 987, succeeded to the Carolingians as the first of the Capet dynasty. But this house also proved unequal to subduing the great vassals—dukes of Burgundy, Normandy, Aquitaine, counts of Blois, Champagne, Anjou, Flanders—or the great clergy, who had acquired vast lands and privileges. These frequent conflicts promoted a division in language and ways of life, which produced the *langue d'oïl* (Romance) and *langue d'oil* (Frankish) trends.

The conquest of England by William, duke of Normandy, and



FRANCE: MAPS ILLUSTRATIVE OF THE HISTORICAL DEVELOPMENT OF THE COUNTRY



later the marriage of Eleanor of Aquitaine, divorced wife of Louis VII, with Henry II, William's great-grandson, created links between England and France which provoked conflicts over seven centuries. It was Philip II (Augustus) who regained, in 1203-04, all the lands previously lost to English rivals with the exception of a part of Guienne; he also curbed the independence of the great peers, established the hereditary monarchy, and created an efficient and far-reaching administration of the crown. The crusades in which he, like his predecessors and his grandson Louis IX (S. Louis), took part, were helpful inasmuch as they diverted the interest and forces of the nobility to an external task. Along with these changes in the political and social structure, a refined and complicated code of chivalry established itself which made French nobility, its offshoots in England, Spain, Sicily, and the E. Mediterranean, and its counterparts in the church—like S. Bernard of Clairvaux—the examples of European society. Romance and Gothic buildings, the songs of the troubadours, and the rise of the bourgeois in strong and wealthy towns were the outward symptoms of French predominance during the 11th-14th centuries.

#### The Hundred Years' War

The death of the last male Capet in 1328 and the succession of the related house of Valois produced a claim to the crown by Edward III of England who was equally closely related. The consequence was the Hundred Years' War, with French defeats at Crécy, 1346, Poitiers, 1356, and Agincourt, 1415. It was in fact two series of wars separated by an interval of nearly 40 years, and interspersed with what would be called today democratic or socialist revolts against king and nobility by the townsmen in Paris, 1356 and 1382, and other towns, and by the peasantry in the Jacquerie rising of 1358. Intrigues and alliances among rival rulers, especially those of Burgundy, ended favourably for the French dynasty with the appearance in 1429 of S. Joan of Arc, the inspired peasant girl who liberated Orléans and brought about the coronation of Charles VII at Reims. Charles subsequently created a standing army and a new system of taxation; and in spite of the adherents of such factions as the Armagnacs and Burgundians, gained authority

over almost all France. Calais, however, remained in English hands until 1558.

The tendency towards centralised and absolutist monarchy showed itself likewise in French relations with the Church. When a Frenchman, as Clement VI, was elected pope in 1305, he was made to stay in France, and he and his successors resided at Avignon in Provence from 1309 to 1378. Two others, called anti-popes, because rivals ruled at the Vatican, resided at Avignon 1378-1423.

#### Reformation and Religious Wars

This Great Schism, with the jealousies and corruption it involved on both sides, paved the way for subsequent reforming movements and religious wars. France secured partial independence from the papal authority by the Pragmatic Sanction of Bourges, 1438, establishing the liberties of the French, or Gallican, Church. Strengthened thereby, the monarchy set out to crush the great vassals, and after the most powerful of them, Charles the Bold of Burgundy, had died fighting the Swiss in 1477, Louis XI united all the lands of France except Brittany; warring between the nobles, formerly an established custom, was prohibited, and prominent bourgeois were admitted to the nobility and its privileges.

The great innovations of printing and gunpowder, the discovery of the Americas, and the Reformation favoured what later came to be called the Renaissance in France. Apart from its effect on literature and the arts, this produced close and ambiguous relations with Italy and frequent wars in which the French aimed at the acquisition of Naples and Milan. In a clash with the imperial power of the Hapsburgs, the French king Francis I, after a victory at Marignano, 1515, was defeated and taken prisoner at Pavia, 1525. The wars brought Italian habits and manners to Paris—fencing, astrology, condottieri, and the hired bravo and poisoner—especially after Henry II had married the Florentine Catherine de' Medici and left her as regent after his death in 1559. Under her influence the struggle against the Reformation took the form of a religious civil war. In a deeper sense it was a struggle for or against the arbitrary power of an absolutist regime.

The League, led by the dukes of Guise and supported by the Paris citizens and abroad by Philip II of Spain, represented the

Catholics; the Prince of Condé and Admiral de Coligny the Huguenot represented the anti-absolutist and reformed parts of the nation. After much fighting, bargaining, concession, and retraction, Catherine and her weak son Charles IX tried to solve the conflict by the massacre of S. Bartholomew, Aug. 24, 1572. The wars, notable for the unbreakable resistance of Calvinist La Rochelle—one of the numerous fortresses of medieval France—ended only by the accession in 1589 of the first Bourbon king, Henry IV (of Navarre). A Protestant, practical and well-meaning, he compromised with those among the Catholic nobles and politicians who, like him, wanted to rid the country of war, lawlessness, and foreign mercenaries; and since the majority favoured the old Church, four years after his accession he accepted the Catholic faith. His cynical remark, "Paris is worth a mass," and his dictum, "I want every Frenchman to have a chicken in his pot every Sunday," have never been forgotten; but his edict of Nantes, 1598, granting full religious liberty to all his subjects and state salaries to the clergy of both denominations, as well as the plans for the reconstruction of the country and for a system of permanent European peace and cooperation elaborated by his minister Sully, are greater titles to glory. He failed, largely as a consequence of economic changes brought about by the influx from the New World of gold and silver, which increased the prices without adequately raising wages; and by his failure to abolish the old privilege of the peerage, and of the new nobility "of the robe" (judges, civil servants, etc.), of exemption from taxation.

#### Cardinal Richelieu's Power

Henry IV was murdered by a fanatic. He was succeeded by his son Louis XIII, a minor, for whom another Medici queen, Marie, his second wife, acted as regent. She entrusted power to Cardinal Richelieu who, from 1624 to 1642, as the first of a long line of chief ministers, tried to subdue the grondees, especially the royal princes and princesses; abolished the privileges of the Huguenots after taking La Rochelle, 1628; and fought the two Hapsburg powers, Spain and the Empire, from 1635 (the Thirty Years' War). While he strengthened the absolute monarchy, Richelieu failed to abolish the old abuses of unequal taxation, sale of

offices, and unbudgeted expenditure. Under his successor Cardinal Mazarin, an Italian favoured by Anne of Austria, widow of Louis XIII, and regent for another minor, Louis XIV, heavy taxation and dishonest finance led to a revolt called the Fronde, 1648-53, during which such parliament as there was took side with princes and clergy fighting against the crown. The crushing of this revolt added to the early glory of Louis XIV, who already at 15 was flattered by his court, proud of having won Alsace from the Empire by the treaty of Westphalia in 1648.

Surrounded by such thinkers and poets as Pascal, Malherbe, Corneille, and La Rochefoucauld, Louis proceeded to secure his absolute power (" *L'état, c'est moi !* ") and installed his ministers and regional representatives in such a way that the hard grip of the monarchy ultimately produced revolution. Louvois organized the army; Vauban built fortresses; Luxembourg and Turenne won battles against Spain, Austria, Brandenburg, wresting Lille from the Spanish Netherlands and Strasbourg from the Empire; Colbert planned finance and economies on mercantilist lines; Mansart and Le Nôtre created Louis's palace of Versailles, where with extreme pomp and luxury there grew up a court ceremonial soon aped by nearly all the other courts of Europe. Louis behaved and was treated like a divine personage; he wasted money regardless of the misery of his people; and while his court attracted poets, authors, artists of great merit—the comedies of Molière, the dramas of Racine, the fables of La Fontaine, the thought of Boileau and Bossuet were its products—the population was dragooned, impoverished, and decimated by epidemics and wars.

#### The Sun King in Eclipse

In his old age, after a lifetime of dissipations (with many famous mistresses, the last of whom, Mme. de Maintenon, he married after the queen's death), he turned to religious zealotism, and then even what spiritual liberties there had been were abolished. In 1685 Louis had abrogated the edict of Nantes and driven many Huguenots to emigration, to the great benefit of the Netherlands, England, and Brandenburg-Prussia. The Jansenists, a liberal group of earnest Catholics, attacked by the Jesuits and the pope, soon followed suit, their seat, Port-Royal, being finally razed to the ground in 1710. Dying in 1715, after a reign of 72

years, 54 of which had seen the personal sway of the *Roi Soleil*, Louis XIV had brought France to the brink of ruin: his defeats by Marlborough, Eugene of Savoy, and the Anglo-Dutch fleet under Lord Russell, between 1692 and 1710, heavily impaired his military prestige; he failed to conquer the Netherlands, which had freed themselves from Spanish rule; and his grandiose colonial empire, lacking systematic support, was soon to wither away under the pressure of the British expansion.

#### The Mississippi Bubble

With the extremely heavy poll taxes imposed during the last period of his reign, and the loss of man-power during his incessant wars, Louis left to his five-year-old great-grandson, Louis XV, a sadly reduced kingdom. The regent, the dissolute duke of Orleans, entrusted the Scottish banker John Law with the task of repairing France's ruined finances by experiments in a state bank and joint stock enterprises (the "Mississippi bubble"); when that failed the prime minister, Cardinal Fleury, had great ado to establish a balance. The king, under the influence of his several mistresses—among whom Mme. de Pompadour and the Du Barry are best known—neglected his duty and, in fits of religious zeal, continued to suppress with fire and sword all religious independence. The "wind of revolution," as d'Argenson called it, was blowing from England and led to "remonstrances" by the parliament of Paris—there were several parliaments elsewhere, but as yet none properly elected—and the spiritual movement later summarised under the title of Enlightenment began to spread. Voltaire became its head, recognized by all Europe. The Encyclopédistes, such as Diderot and d'Alembert; the political philosopher Montesquieu; economists who believed they had discovered the laws of Nature and called themselves physiocrats, and other free thinkers contributed to it. Finally, Rousseau, with his Social Contract, 1762, proclaimed full democracy.

Military losses in the Seven Years' War against the Prussian Frederick the Great, and also in colonial wars against England, in Canada, Louisiana, and India, combined with the new ideas and the American revolt, were too heavy an inheritance for Louis XVI, who succeeded his grandfather in 1774. Ignorant if well-meaning, he allowed his ministers—the physiocrat Turgot, then the

economist Necker, and finally Calonne—to experiment with reforms which brought some favourable results. But the American example, together with public opposition to social and economic inequality and to the luxury of the court dominated by his pleasure-loving queen Marie Antoinette, forced more drastic measures.

On May 5, 1789, the states-general assembled for the first time since 1614. Formerly a purely advisory body, its form was revolutionised by the inclusion of the Third Estate in numbers equivalent to the total representation of the two previously decisive bodies, clergy and nobility. This date in effect, and the storming of the Bastille (July 14) in the popular mind, mark the outbreak of the French Revolution (*q.v.*). On June 17 the Third Estate declared itself the constituent assembly of the nation. Three days later, inspired by the example of America, by the oath of the tennis court, it swore not to dissolve before a constitution had been granted. There was no action against the monarchy, but when the king allowed himself to be persuaded to concentrate troops and dismiss Necker, the prime minister, revolt broke out and the Bastille, a royal fortress, was demolished. Paris and other cities raised a National Guard: the intimidated nobility and clergy surrendered their privileges; municipal councils came into being; the peasants took up arms; and the Parisians forced the king, his family, and the states-general to return from Versailles to Paris. The Rights of Man were embodied (Aug. 26) in a declaration which became the basis of succeeding French constitutions. So ended the first chapter of the revolution.

#### War Declared on Austria

The next phase was dominated by the figure of Mirabeau, the great leader of the moderate constitutionalists. When Mirabeau died, April 2, 1791, the assembly fell under the spell of the radical Jacobins. Louis XVI, accepting the constitution but deeply shocked by anti-clerical measures, tried to escape to his armies on the E. frontier, but was caught and "suspended." He continued to resist steps taken by the assembly against emigrants and the clergy. But he was persuaded to declare war upon Austria, and the initial French defeats and advance of Prussian troops deep into France thoroughly exasperated the masses. The Paris mob broke into the Tuileries palace and

dragged the royal family to prison, Aug. 10, 1792.

The radicals known as the Mountain, because of their seats on the top rank of the chamber, and led by Robespierre, Danton, Marat, and St. Just, now openly proclaimed a republic. There followed massacres of the royalists, the Reign of Terror, and on Jan. 21, 1793, the execution of Louis XVI; nine months later, Marie Antoinette followed him to the guillotine. A new constitution was established, the *levée en masse* was ordered, and, in spite of war abroad, conflicts within the revolutionary groups in Paris, and civil war, especially in the Vendée, far-reaching and partly successful reforms were carried out. Of these, the systematic organization of public instruction, the metric or decimal system, the systems of jurisdiction and administration, survive mostly to this day.

#### Napoleon Bonaparte

This chapter of the revolution ended in July, 1794, with the extermination of the leaders themselves. The Convention—as the assembly had called itself—was superseded by the Directorate which, with the help of young Gen. Bonaparte, in Oct., 1795, quashed a royalist revolt in Paris. From then on this Corsican soldier, "son of the revolution," marched from success to success, winning victories in Italy, 1796–97, undertaking his Egyptian expedition against England, 1798–99, and on Nov. 9, 1799, overthrowing the Directorate. He replaced it with the Consulate, in which, with two nominal colleagues, he exercised monarchical power. A year later he had vanquished the second European coalition and saw France's Rhenish frontier and the republics his sword had created in Holland, Switzerland, and Italy recognized by the Continental powers in the Lunéville peace of 1801. Within France he brought about centralization, and the codification of the uncertain and regionally diverse laws. But, bent upon conquest and personal glory, he allowed the finest flowers of French spiritual and artistic life, so far as they had survived the revolution, to wither, and sacrificed in military expeditions much blood and wealth of a country scarcely recovered from the havoc of the Terror and the swindle of the *assignats* (*q.v.*).

After securing the consulate for life, Napoleon made himself hereditary emperor of the French, May 18, 1804, and prevailed upon

the pope to come to Paris and crown him, Dec. 2. His rule was despotic and, in his choice of means, unscrupulous. Bribery, by means of titles of nobility, decorations, and valuable gifts, censorship, espionage, state prisons, were its characteristics. The French Revolution had ended in a military dictatorship, whose very nature forced it to go on making war. In 1806 Napoleon devised the Continental System to blockade England, but the result was privations for France and for the host of satellite and subject states and kingdoms which the emperor had created around her borders and provided with sovereigns from his own family or friends. He broke asunder the ramshackle Holy Roman Empire and, though only half conscious of this mission, spread the ideas of the French Revolution with its slogan—Liberty, Equality, Fraternity. Finally, in 1812, he attacked Russia and failed.

Napoleon's empire collapsed more rapidly than it had emerged from the ashes of feudal France consumed by the fire of the Revolution. Another European coalition advanced victoriously and, on March 30, 1814, captured Paris.

#### France Defeated at Waterloo

The emperor was banished to Elba and replaced by Louis XVIII, who created a liberal constitution with two legislative chambers and electoral rights based upon property qualifications and indirect polling, and was brilliantly represented at the Vienna congress by Talleyrand. On March 1, 1815, Napoleon escaped and returned, but was defeated at Waterloo (June 18) and banished to St. Helena. The main lasting results of the Revolution and the Napoleonic exploits were an independent and mainly well-to-do peasantry settled on the former feudal estates now held by small farmers in adequate allotments; public budgets, annually published; a fair system of taxation; the Bank of France; a codified judicial system; the institution of the National Guard, the basis of obligatory military service; the territorial division into departments, which fostered centralization; equality of personal rights.

What liberalism there had been at first following the royalist restoration rapidly vanished. Such reactionary measures as censorship of the growing press and electoral privileges for the landed gentry, reintroduced by Louis XVIII and maintained by his

brother and successor Charles X, brought about another revolution in 1830. Though it was fought out at the barricades, overthrew the senior line of the Bourbon dynasty, and restored most of the constitution of 1814, only one section of the French people benefited from it: the bourgeois. They replaced nobility and clergy as the ruling class, made the National Guard—to which every able-bodied man belonged who could afford to equip himself—their instrument of power, and, in Louis Philippe, set up a bourgeois king, with the slogan "Enrich yourselves." His uneasy regime lasted until the 1848 revolution. The Second Republic emerged, with universal male suffrage that increased the electorate from 250,000 to 9,000,000; with a daily allowance for deputies; and with a powerful president at the head of the executive.

#### Napoleons II and III

The first elected president was, significantly, another Napoleon, nephew of the first; ambitious like his uncle, but without his outstanding gifts. By winning over the army, the clergy, and the provincial conservative elements who feared the industrial and increasingly socialist masses of Paris, he obtained first restrictions of the universal suffrage; then, following a vain attempt to have his reelection secured by the chamber, arranged a *coup d'état* on Dec. 2, 1851, which, after sanguinary street-fighting, established him as dictator. A year later, a plebiscite made him emperor as Napoleon III (this title suggesting that Napoleon I's son, the duke of Reichstadt, should rightfully have been Napoleon II, 1821–32). Kind-hearted and possibly liberal at heart after his many experiences in exile and comparative poverty, Napoleon was not equal to the role of tyrant or conqueror. He created institutions modelled upon those of his uncle and purporting to introduce a democratic regime: elections, with engineered majorities for the government; powers of suspension or suppression of newspapers that were supposedly free from censorship; much curtailed rights of the legislative body, which became the mere mouthpiece of a council of state.

Marrying the ambitious Spanish countess, Eugénie de Montijo, Napoleon soon started a series of military adventures abroad, with success in the Crimean War, which strengthened the ties with Great Britain. The Paris exhibition of

1855 gave lustre and the appearance of prosperity to his regime. He won Savoy and Nice, 1860, by siding with Piedmont against Austria; and increased France's colonial empire by adding to her Algerian and Senegalese and conquering Indo-Chinese territories. But he failed to uphold Maximilian, the ruler of the Mexican empire established by French bayonets. His rule, apparently consolidated by concessions he had made during the preceding ten years to the growing spirit of liberalism, collapsed under the first blows of Bismarck's Prusso-German armies. Taken prisoner, Sept. 1, 1870, the emperor was succeeded by the Third Republic, proclaimed in Paris, Sept. 4.

The republic put up a brave resistance under Gambetta and Thiers, but after Paris had capitulated, Jan. 28, 1871, had to sue for peace. Signed at Frankfurt-on-Main, May 10, the treaty robbed France of Alsace and Lorraine and ordained the payment of an indemnity of £200 million. In spite of these losses, and of ten weeks of civil war in Paris between the *Commune* and the government, France recovered rapidly, though incessant political strife for many years threatened the republic with the restoration of a monarchy. Recovery was due to technical innovations and industrial habits and experiences borrowed from Great Britain, combined with the thrifty and industrious character of the French population. The *rentier*—ideal of the middle and lower middle classes—entrusted his savings to the state at a low rate of interest, or favoured such enterprises as visibly catered for the public—the new department stores, big banks, transport, tourist or health resorts—while supplementing his income on the other hand by adventurous foreign investments promising a high rate of interest, and thereby contributing to the rise of Paris as an international money market.

#### The Dreyfus Case

In 1877, under the cabinet of the duc de Broglie, with Marshal MacMahon as president, and again during the anti-republican campaign in 1889 of the former minister of War, Gen. Boulanger, the parliamentary and democratic regime was endangered. These dangers once overcome, the reactionary or anti-republican powers began to wane; a systematic and successful colonial policy contributed towards French power and prestige; and the German danger

was countered by a policy of *rapprochement* with tsarist Russia, 1891-93. The Panama scandal, 1892, and the ugly case of Alfred Dreyfus (*q.v.*) provoked passionate conflicts within the nation and embittered normal political rivalry to a disastrous degree. The result of the latter was the reduction of the extra-parliamentary influence of the military parties, with the formation, under Waldeck-Rousseau, of the *Bloc républicain*.

This was in 1899, and it was soon followed by an attack upon the Church as a political power. Under Combes and Briand, 1902-1905, the separation of Church and state was voted and, with some disturbance and resistance, carried out.

#### The Entente Cordiale

The public mind was more exercised by the German danger, personified by the restless and ambitious William II. This led to the Entente Cordiale, April 8, 1904, by which the Anglo-French dispute over Fashoda (*q.v.*) was resolved and all other colonial matters were amicably settled. In subsequent conflicts with Germany over North Africa—William II's landing at Tangier in 1905, the Algeiras Conference of 1906, and the dispatch of a German gunboat to Agadir in 1911—British support proved of great value to French policy. Meanwhile French Socialism had made great progress. Its greater and more cooperative sector, under Jean Jaurès, had ever since the Dreyfus case supported the bourgeois Radicals; but when strikes with a revolutionary tendency occurred, Clemenceau, and after him Briand, suppressed them by force of arms and other drastic measures. It needed the danger of impending war to draw the Left together again. In 1913 conscript military service, which had been fixed at two years in 1905, was extended to three years.

When war broke out on Aug. 3, 1914, even the Socialists, whose leader Jaurès had been murdered on July 31 by a nationalist fanatic, voted for the war credits and joined the *Union Sacrée*. This unity held throughout the four years of struggle, despite initial defeats and retreats, the "miracle of the Marne," and the endless bloodshed on the Somme and at Verdun. When some despondency was spreading in 1917 and here and there mutiny seemed likely, the entry of the U.S.A. into the war and the acceptance of the premiership by Clemenceau steadied France's nerves and revived her characteristic *élan*. Despite Rus-

sia's breakdown and the loss of large part of French savings invested in loans for the tsar, and in face of the devastation of her N.E. provinces, France held on to help secure victory for the Allies.

Clemenceau was not to reap his harvest. After many months of dispute with his allies, the peace treaties with Germany and her satellites were settled in the summer of 1919; yet, when the "Tiger" stood for president, Jan., 1920, he was defeated. Not was there much inspiration about the reconstruction of war-stricken France, corruption and abuse damping the idealism left among the people by their heroic stand and victory.

#### Edgar Stern-Rubarth

**BETWEEN THE WARS.** Despite the difficulties attending the signature of the Versailles peace treaty, few Frenchmen doubted that their country would regain its position as the leading power in Europe. Though Clemenceau and Poincaré had been unable to obtain the annexation, or at least transformation into a buffer-state, of the German lands W. of the Rhine, security seemed established by the covenant of the League of Nations and military alliances with Great Britain, the U.S.A., and the E. and S.E. neighbours of Germany who all looked to France for financial and military support. Financially, the unfortunate slogan of Clemenceau's minister of finance, Klotz: "*Le Boche payera*" (the Germans will pay), and treaty clauses which left indefinite claims open, promised recovery and prosperity. The territorial loss of 1871 had been made good; and the occupation of the Saar for at least 15 years promised rich returns, as did the principle of "reparations in kind"—coal, chemicals, timber, etc.

#### Failure of Versailles Treaty

These pleasant prospects were soon shattered. The U.S. congress failed to ratify the Versailles treaty, and, consequently, the military guarantees to France, in which latter respect Great Britain followed suit; the League's structure was irreparably damaged by the American refusal to join; and the flow of gold and goods from the war-exhausted, inflation-ridden Germany soon began to slacken. Four years of uncertainty brought recriminations against the recent allies and their financial claims on France; attempts to gain by pressure or by political manipulation the safeguards against Germany that had been given up at Versailles; con-

ferences and negotiations, financial abuses and malpractices. Lloyd George offered at Cannes, 1922, a new security pact; but Aristide Briand, in his seventh premiership, was overthrown during his absence from Paris before these negotiations matured.

Poincaré succeeded him as premier. His attempt to disrupt German unity and to secure the more material benefits of "reparations in kind" by occupying the Ruhr area on Jan. 10, 1923, only estranged Great Britain and led the German government to adopt a policy of passive resistance and reckless inflation which destroyed her ability to pay reparations. When they became aware of the facts, the French people turned against Poincaré, who had already lost favour by increasing taxes. The *Cartel des Gauches* (Left coalition) led by Édouard Herriot, won the 1924 elections; and for two years cabinets under Herriot, Painlevé, and Briand tried a fresh approach in German policy.

#### The Treaty of Locarno

The Dawes Plan (*see* under Dawes, Charles Gates), Aug., 1924, attempted a reparations settlement; the treaty of Locarno, Oct., 1925, gave a five-power guarantee of the Franco-German frontier; there were the re-assertion of the Entente Cordiale between Herriot and Sir Austen Chamberlain, and the favourable Mellon-Bérenger arrangements in Washington, and the Caillaux-Churchill arrangement in London, over the payment of war debts. In spite of trouble arising from relations with the Vatican, rebellion in Morocco, and a revolt in Syria, a more hopeful international era seemed to have dawned. But a sharp depreciation of the franc unsettled the Left and Poincaré reappeared as head of a new *Union Nationale* of all the bourgeois groups. His drastic measures immediately applied gave him the title of the "saviour of the franc." He retained Briand as foreign minister, but slowed the pace of international conciliation. He also began in 1928 to build the huge line of supposedly impregnable fortifications in the E. called after his war minister, André Maginot.

Poincaré's activity underlined France's role as protector of her smaller allies, the Little Entente (*q.v.*), Poland, and Belgium against potential German aggression, and filled the gap which Herriot, against British objections, had tried to stop with the frustrated Geneva protocol of 1924. His

three years in office to July, 1929, were the most happy and prosperous period France was to know between the two Great Wars, marked by successful industrialisation, growing exports and tourist trade, a boom in the motor car, cinema, and building industries, and a surplus in the exchequer.

#### Evacuation of the Rhineland

Briand, premier for the tenth time, lasted three months, and was replaced by André Tardieu, who, however, left foreign affairs in Briand's hands. A revised reparations plan, the Young Plan (*q.v.*), was signed at The Hague in 1930; total evacuation of the occupied Rhineland followed. Tardieu's display of intransigence, however, which was meant to appear patriotic and to win support from the Right but was rarely maintained against pressure, exercised an adverse effect upon Franco-British relations. Briand's foreign policy was discredited thereby, and still more by a mismanaged attempt at forming a German-Austrian customs union in March, 1931. Financial disasters in rapid sequence—repercussion of the American financial disaster of 1929—beginning in Austria, shattered the whole structure of European economies. When Briand stood for president he was beaten by his Right-wing opponent Doumer, but Pierre Laval, who succeeded Tardieu in 1931, retained him in his government. In Washington, Laval tried in vain to obtain from President Hoover assurances as to the "interdependence" of the latter's moratorium for Germany's reparations payments and France's own war debt payments; at the beginning of 1932 Laval dropped Briand, who died March 7, after Tardieu had taken the helm.

#### Triumph of the Socialists

Financial scandals and large-scale bankruptcies shattered public confidence in semi-Right governments of the Laval-Tardieu type, and the general elections of May, 1932, returned the Radicals triumphant. Their leader Herriot was supported by the Socialists and was unaffected by efforts by the Right to turn into a "Red scare" the murder of President Doumer by a Russian maniac on May 8. But he was confronted with a new phenomenon in Germany, the semi-dictatorial cabinet of von Papen. At Lausanne, in July, under the chairmanship of the British premier, Ramsay MacDonald, agreement was reached regarding the cancellation of Germany's reparations payments;

but a split over disarmament estranged not only the Socialists but some of Herriot's own party and laid the foundations for that fissure of the Left in French opinion that was to last out the ramshackle peace.

Through Paul-Boncour, Herriot presented at Geneva a plan of mutual assistance by special forces of the member states earmarked for League requirements, and the international control of civil aviation. The cold reception of this plan, together with a conflict over the payment of another instalment of the French war debt to Washington—since France was no longer receiving reparations from Germany she jibbed at continuing to pay her war debt to the U.S.A.—overthrew Herriot's cabinet, Dec. 15, 1932. Paul-Boncour succeeded him for a bare six weeks.

#### Short-lived Governments

Just before Hitler assumed power in Germany, Édouard Daladier, a former teacher, a Radical and supposedly a strong man, took office. He was to remain, with interruptions and vicissitudes, a leading figure for five years. His first cabinet, Jan. 29–Oct. 23, 1933, has been described as the last comparatively stable and normal government of the Third Republic. Thereafter, the numerical majority of the Left began to destroy its own governments. It began in Oct. with a violent conflict over the budget. It then overthrew a short-lived Sarraut government and another under Camille Chautemps (Nov., 1933–Jan., 1934), after the riots caused by the Stavisky (*q.v.*) scandal. Nor was a second Daladier government more fortunate, for on Feb. 6 it was driven out by street brawls—for whose consequences the extremist nationalist groups, especially the *Croix de Feu* under Col. de la Rocque, claimed the doubtful glory.

The clamour for a strong man led to the appointment of Doumergue, whose cabinet, including Herriot, Tardieu, Barthou, and Chéron, had the appearance of solidity and balance. Attacked by the Socialists under Léon Blum, deserted by the Radicals who tried to save parliamentary government, it fell in Nov. and was immediately followed by the government of P. E. Flandin. This cabinet closely resembled that of Doumergue, but omitted Marshal Pétain, who had held the portfolio for War, and included Mandel, once Clemenceau's intimate. The foreign minister, Barthou, in company with King Alexander of Yugoslavia, fell

victim at Marseilles to the bullets of a Croat assassin. He was succeeded by Laval, who made contact with Ribbentrop, Abetz, and other Nazis; smoothed the path for the Saar plebiscite which returned that rich area to Germany Jan. 13, 1935; and was the father of *rapprochement*. Before signing a pact with Moscow, May 2, 1935, he went to Rome to re-establish the "Latin sisterhood"; Mussolini reaped the fruits of this agreement in his attack on Abyssinia. The doubling of the period of military service in France gave Hitler a pretext for the reintroduction of conscription in Germany. Laval and Flandin sent a protest to Geneva and went to Stresa to confer with Ramsay MacDonald, Sir John Simon, and Mussolini, whose forces were already on the way to Abyssinia.

#### Penetration of Fascism

On May 31 the Flandin cabinet fell, following the introduction of deflationary measures demanded by the Banque de France. After some difficulties, Laval formed a government. Cuts in the budget were accepted; labour troubles ensued; the *Croix de Feu* staged more demonstrations; and the outcome was the rise of the *Front Populaire* (people's front) embracing Radicals, Socialists, and Communists. Passions began to run high over the Anglo-German naval agreement, the question of sanctions against Italy, the Hoare-Laval plan for the partition of Abyssinia, and the increasingly visible penetration of fascism into French political life. On Dec. 28 Laval resigned. He was followed by Sarraut, with Flandin as foreign minister. France was next confronted with Hitler's reoccupation of the Rhineland, March 7, 1936, in violation of the Versailles treaty and the Locarno pact. But the opportunity thus presented for legally breaking the Nazis' power and the myth of their invincible success was missed. General elections strengthened the *Front Populaire*, mainly by doubling the Communist figures, which were equal to those of the Radicals, with the Socialists, strongest of the three Left groups, clearly holding the balance. Blum became the first Socialist premier of the French republic, June 4. He held this office just one year; then served under Chautemps as vice-premier; then, March 13-April 10, 1938, led another cabinet.

Blum was faced with one of the most disastrous strike waves France had known; the "sit-

down" strike, in which the workers remained in the factories, but did not work, spread like an epidemic. A forty-hour week, paid holidays, and collective contracts were the result; devaluation of the franc followed. Nationalisation of the armament industry was decided upon, but never carried out. In foreign politics, Blum and his foreign minister Yvon Delbos undertook *rapprochement* with London, toleration of the *fait accompli* of Mussolini's Abyssinian conquest, and, when the Spanish civil war broke out, support for the legitimate Republican government. In the last aim, however, the Blum government was obstructed by the non-interventionist attitude of other nations. A less enthusiastically *Front Populaire* government under Chautemps followed in June, 1937, including Blum and Delbos, but with Georges Bonnet as finance minister. Bonnet further devalued the franc, but was so disliked by the Socialists that they left the government in Jan., 1938, Chautemps resigning in March.

#### Wave of Defeatism

In that month the Nazis moved into Austria. A wave of defeatism swept France, nurtured by fascist ideologists and by traitors. Blum tried to assemble a national government wider and stronger than the weakening *Front Populaire*, but had to be content with a Socialist-Radical coalition that survived only four weeks, after making a brave attempt at rearmament and stabilisation of finances by means of a capital levy. Another Daladier cabinet followed, with Bonnet as foreign minister. Bonnet accepted Mussolini's conquest by appointing a new ambassador to the "king of Italy and emperor of Abyssinia"; then went with Daladier to London for conversations with Neville Chamberlain and Lord Halifax. In London "staff contacts" were arranged, with "assurances" to both Berlin and Rome; the Spanish Republicans were abandoned; and a compromise over the Nazis' claims in Czecho-Slovakia was at least envisaged. The visit to Paris of George VI and Queen Elizabeth in July confirmed Franco-British friendship and solidarity. When the Czecho-Slovak crisis broke it was Bonnet rather than Daladier who prevailed over the remnants of French pride and military self-confidence, discarded France's treaty obligations towards Prague, and her pact with Moscow, and helped to foster the compromise of

Munich (*q.v.*). The mobilisation (Sept. 23, 1938, had been expensive, and Paul Reynaud, finance minister, asked for drastic measures to cover both this expense and a huge rearmament programme. Among these necessary steps was the abolition of the forty-hour week.

Visits to Paris by Ribbentrop, and by Chamberlain and Halifax on their way to Rome, were followed by the recognition of the Franco regime in Spain. But when Hitler's occupation of Prague, March 15, 1939, revealed the uselessness of appeasement, France partially regained her old vigour. Within a month nearly a million men had been mobilised; the minister of Colonies, Mandel, was working hard to bring the resources of the empire into play.

#### Weakness in the Air

Preparedness for war, however, was insufficient, especially in the air. The person mainly responsible was Pétain, president of the supreme council of national defence, who believed neither in aeroplanes nor in the armoured cars advocated by a certain Capt. Charles de Gaulle, whose writings had created a sensation on the other side of the Rhine. For a time the French people were confident in their leaders and chiefs. But anxiety succeeded the careless satisfaction that had followed the Munich agreement, and by mid-Aug. the reasons for anxiety grew clearer. The technicians and reserve officers appointed for the key positions were already at their posts on the Maginot Line. Shortly after the ultimatum of Germany to Poland came the mobilisation, Sept. 1, 1939.

#### Gustave Cohen

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LANGUAGE AND LITERATURE. One of the Romance family of languages, French had its origin in the popular Latin (*sermo plebeius* or *rusticus*) spoken by the Roman soldiers, merchants, and colonists in Gaul. Scarcely affected by Celtic influences, this popular Latin tongue, one distinguishing feature of which was the substitution of analytical forms for the elaborate case and verbal inflections of literary Latin, had already established itself by the end of the first century of the Christian era.

As they amalgamated with the Gallo-Roman people, the Frankish conquerors adopted it in their turn, adding to its vocabulary a small infusion of words chiefly of political or military significance, e.g. *vassal*, *fief*, *haubert* (*halsberc*), *heume* (*helm*), *guerre* (*werra*), but contributing little to its phonetic or syntactical development. By the 7th century this *lingua romana rustica*, spoken by all classes and accepted by the Church, though not yet committed to writing, had passed into a form which can be recognized as embryonic French.

The character of this transitional tongue may be judged from the first important monument of it, the Strasbourg Oath, by which, in 842, Louis the German entered into alliance with his brother Charles the Bald: *Pro Deo amur et pro christian poble et nostro commun salvament, d'ist di en avant, in quant Deus savir et podir me dunat, et salvarai eo cist meon fradre Karlo, et in adjudha et in cadhuna cosa, si cum on per dreit son fradra salvar dift, in o quid il mi altresi fazet. In modern French this is: Pour l'amour de Dieu et pour le salut du peuple chrétien et notre commun salut, de ce jour en avant, autant que Dieu me donne savoir et pouvoir, je soutiendrai mon frère Charles et en aide et en chaque chose, ainsi qu'on doit, selon la justice, soutenir son frère, à condition qu'il m'en fasse autant.*

#### Langue d'Oc and Langue d'Oïl

But though now the common language of the country, the prevailing feudal confusion was fatal to its uniform development, and for a time it was broken up into a number of independent dialects. The principal division was into the *langue d'oc* of the south, which approximated to the Italian and Spanish modifications of the Romance stock, and the *langue d'oïl* of the north, the parent of modern French; but in the *langue d'oïl* itself there were at least six well-marked varieties—e.g. those of Normandy, Burgundy, and

the Ile de France. But the election to the monarchy of Hugh Capet, duke of France, in 987, made Paris the capital of the kingdom and gave the dialect of the Ile de France, or French as it was specifically called, an enormous advantage over its rivals, and with the steady political unification of the country from the 12th century onward this gradually became the official language of the entire people. The other dialects of the north, and later the *langue d'oc* or Provençal, sank into the condition of mere patois. It was not, however, till the 15th century that the triumph of the French tongue was complete and its stability and uniformity definitely assured. By this time the case-endings and other synthetic features of the *lingua romana*, which had lingered in Old and Middle French, had entirely disappeared.

#### Evolution from Latin

Philology has established the fact that the evolution of French out of Latin was governed by certain fundamental laws, of which the most important are: (1) the persistence of the Latin tonic accent; thus *amāre* became *aimer*, *p'rticus*, *p'rtche*; (2) the contraction or loss of the Latin termination, as in the examples just given; (3) the disappearance of the short vowel immediately preceding the stressed syllable; e.g. *bonit tem* = *bonté*, *clarit tem* = *clarté*, *septimana* = *semaine*; (4) the suppression of the medial consonant: e.g. *mativus* = *maurus* = *mür*, *confidentia* = *confiance*. These morphological rules, however, apply only to the natural and spontaneous evolution of the language and lapse entirely in respect of that large portion of the modern vocabulary which consists of words afterward imported from the Latin by scholars and writers (*mots savants*). Hence we can at once decide in the case of the many existing doublets, or words slightly differing in form though ultimately derived from the same sources, e.g. *chose* and *cause*, *hôtel* and *hôpital*, *confiance* and *confidence*, which belong to the primitive and popular foundations of the language and which are of later and artificial origin.

LITERATURE. Though a few religious poems of earlier date have come down to us, French literature really begins with the epic poetry of the 11th, 12th, and 13th centuries. This poetry, which is full of the chivalrous spirit and is essentially aristocratic in character, falls roughly into two divisions: the *chansons de geste* and the *romans épiques*. Of the former,

largely concerned with the fabulous exploits of Charlemagne and his paladins, the most famous example is the *Chanson de Roland*, dating from the second half of the 11th century. Such chansons are supposed to rest upon slight historical bases; the *romans épiques* were legend or fiction.

#### The Arthurian Cycle

Most of these belong to the Celtic legend-cycle of Arthur and the Round Table, e.g. the poems of Chrétien de Troyes, of the second half of the 12th century. Others deal, albeit in a most extravagant way, with classical antiquity (*romans antiques*): e.g. the *Roman d'Alexandre* of the 12th century, which is specially interesting because it introduced the twelve-syllable verse, later the standard measure of French poetry and hence called the alexandrine.

After this epic poetry the most important branch of medieval French literature is the allegorical-didactic poetry which reached its culmination in the *Roman de la Rose*, the first part of which, written c. 1237 by Guillaume de Lorris, contains a courtly "art of love"; while the second, written by Jean de Meung, some forty years later, with its bold satire upon contemporary society, illustrates the rising reaction of the practical bourgeois spirit against the fantastic idealism of the aristocratic classes. This reaction further appears in the *fabliaux*, or short humorous stories in verse, of the 13th and 14th centuries, but its fullest expression is to be found in the *Roman du Renard* (12-14th centuries), which is indeed a kind of anti-romance or burlesque of the fashionable *chansons de geste*.

Although in the N. narrative and didactic poetry flourished most, lyrical verse was cultivated in the S., notably by the Provençal troubadours, who sang of courtly love in elaborate and intricate stanza-forms; but as the old chivalrous sentiments waned the poetry of the latter became increasingly vapid and unreal. The note of sincerity was however, struck by Rutebeuf (d. c. 1280) and 200 years later by the great François Villon. Concurrently the drama, which in origin was the offspring of the liturgy of the Church, evolved through *miracle*, *mystère* and *moralité* into two popular forms of secular play—the *sottie*, a short satiric piece resembling the *moralité* in its allegorical machinery and didactic intention, and the *farce*, which may be broadly defined as dramatized *fabliaux*. Meanwhile prose developed slowly, and it was not until the 13th century

that with Villehardouin's *Conquête de Constantinople* it began to displace Latin in the writing of history. Of the many other chroniclers of the Middle Ages three are particularly noteworthy: Joinville with his *Histoire de S. Louis*, written 1305-09; Froissart with his *Chroniques*, written c. 1373-1400, and Commines with his *Mémoires*, written c. 1488-1500. Prose was also employed for fiction, as by Antoine de la Salle. The exquisite *châtelaine*, Aucassin et Nicolette, of the later 12th century, is an interesting connecting link between the verse and the prose *roman*.

#### Renaissance Influence

In the 16th century French literature, thus far thoroughly medieval in character, was transformed by all the liberalising influences of the Renaissance and especially by the revived study of the literatures of Greco-Roman antiquity, to which the new writers turned for their inspiration and models. In poetry the transition is marked by Marot, and soon after his death the revolution was completed by a group of writers, collectively called *La Pléiade*, whose leading spirit was Ronsard. The manifesto of this brotherhood is contained in *La Défense et Illustration de la Langue Françoyse* (1549), the author of which, Du Bellay, advocates the enrichment of French by the free importation of words and idioms from various sources and particularly from the classic tongues. In regard to literature, he insists that the poet should abandon entirely all the older native forms of verse and devote himself to the production of eclogues, epics, elegies, dramas, etc., in the classic style.

Ronsard himself attempted to naturalise some of the "great types" of ancient poetry in his *Odes*, 1550-53, and his unfinished epic, *La Franciade*; and *Pléiade* principles were also adopted by an outsider, the protestant Du Bartas, in his Biblical epics, *Judith* (1573) and *La Semaine* (1578). The dramatic part of the *Pléiade* programme was carried out by Ronsard's young disciple, Étienne Jodelle. His comedy, *Eugène*, 1552, has little historical importance; but in his two tragedies, *Cléopâtre captive* and *Didon se sacrifiant*, he laid the foundations of that Senecan or classic type of tragedy which was to flourish in France for nearly 300 years. His lead was followed by other writers, notably Garnier, while Larivey, influenced by his Italian models, made a significant innovation by the substitution of prose for verse.

Meanwhile prose literature, hitherto little more than experimental, developed rapidly in many directions. Calvin's *Institution de la Religion Chrétienne* (1st French ed. 1541), though in subject-matter interesting only to the theological student, and Amyot's version of Plutarch (1559), though a mere translation, deserve mention among the monuments of the new prose. This was now freely used for biography and history (e.g. Blaise de Montluc's *Commentaires*, written 1570-77), and for political purposes (e.g. La Boétie's *Discours de la Servitude Volontaire*, first printed 1576, and the *Ménippée* satire, 1594, by Pithou, Passerat, and others). But in general literature the two outstanding names are those of Rabelais and Montaigne, both of whom, despite their fundamental differences, are representative exponents of the emancipated spirit of the Renaissance.

With the 17th century we pass into what French historians call *le grand siècle*, during which the consolidation of the power of the crown, begun by Richelieu, was completed by Mazarin and absolute monarchy finally established by Louis XIV. In literature the triumph of classicism was the concomitant and in large measure the result of this culmination in politics of the principles of centralization and autocracy.

#### The Classic Period

Under the influence first of the salons and then of the Academy, founded in 1635, and the court, literature, too, was reduced to law and order; the individualistic tendencies of the 16th century were checked, and general standards of judgement and taste were prescribed; with the result that, while an artificial unity and great brilliancy and polish were attained, they were attained only at the cost of originality and independence. In poetry the classical movement was initiated by Malherbe, who set out to clear the language of the archaisms of the *Pléiade* and the conceits which had more recently been introduced from Italy, and to regulate versification by the severest rules of technique.

But while Malherbe thus laid down the lines which poetry was to follow for the next 200 years, the real master of the classic school was Boileau, whose *L'Art Poétique* (1674) was long accepted as its authoritative text-book. Only a few writers, one the satirist Régnier, were bold enough to resist the new tendencies. But one great poet of the century, the inimitable fabulist La Fontaine,

though claimed by the classicists, occupies a place apart. While under the dictatorship of Malherbe and Boileau pure poetry declined, the drama, on the other hand, flourished in great splendour. After Jodelle and Garnier little progress had been made in tragedy, though the prolific Alexandre Hardy had done something to popularise it; but the classic type now reached perfection in Corneille and Racine, with whom we may also mention the minor writers, Rotrou, Thomas Corneille, and Quinault. At the same time the comedy of manners and social satire, which had slowly been emerging out of the popular farce, assumed its most brilliant form in the work of the greatest comic playwright of the modern world, Molière, among whose numerous followers two—Regnard and Dancourt—have substantial claims to distinction.

In the general prose of the century the foremost names are those of the moralists, La Rochefoucauld, Pascal, and La Bruyère; and of the preachers and religious writers, Bossuet, Bourdaloue, Massillon, and Fénelon. But letter-writing and memoir-writing were also cultivated with great success; the former in particular by the *incomparable épistolaire*, Mme. de Sévigné; the latter, e.g., by the two famous chroniclers, De Retz and Saint-Simon.

To the 17th century also belong the beginnings of the novel. For its first 75 years indeed prose fiction was mainly represented by the prolix and hopelessly unreal pastoral romance, typified in *L'Astrée*, 1610, of Honoré d'Urfé, and by such *romans précieux* as Gomborville's *Polexandre*, 1638-41; *La Calprenède's Cléopâtre*, 1647, and *Mlle. de Scudéry's Grand Cyrus*, 1649-53. But a bourgeois reaction against these fantastic products of the aristocratic salons soon appeared in Charles Sorel's burlesque, *Le Berger Extravagant*, 1627; and in the same writer's earlier *Francion*, 1622; in Scarron's *Roman Comique*, 1651-57; in Furetière's *Roman Bourgeois*, 1666; and in a different way in Mme. de La Fayette's *Princesse de Clèves*, 1678, we mark the emergence of the novel in its modern form.

#### The Eighteenth Century

While not altogether unchallenged, the classic ideal held sway until the death of Louis XIV in 1715. In the period of growing political and intellectual unrest which followed, though the established theories were maintained, the fundamental character of French literature underwent an



entire transformation, to which the popularity of English literature especially among the bourgeoisie, greatly contributed. In particular, under the influence of the critical and utilitarian tendencies of the age, literature came to be valued less for its aesthetic qualities than as a means of diffusing ideas, and for this reason the representative masterpieces of the century belong rather to the literature of polemical and propagandist purpose than to that of creative imagination. In prose the transition is marked by Bayle, Fontenelle, and Montesquieu. But as early as 1718 the most brilliant exponent of the 18th century spirit, Voltaire, had already opened his long career of prodigious activity and striking success in almost every field. Vast as was his influence, however, it was less profound than that exerted by Rousseau, who passionately attacked all the dominant ideals of his age, and who, in his subjectivity, sentimentalism, and love of nature, may be regarded as the first great precursor of romanticism. After these two the foremost prose writer of the century is Diderot.

Meanwhile, in this uncongenial atmosphere, poetry languished; Voltaire's epic *La Henriade*, 1728; the didactic verse of Louis Racine; the descriptive poems of Saint-Lambert, Roucher, and Delille; and the odes of Jean-Baptiste Rousseau adding little of interest to the possessions of French literature. Some excellent light verse is indeed to be found in the minor poems of Voltaire; in J. B. L. Gresset; and in the *Fables* of Florian; but in its higher forms 18th century poetry had only one acknowledged master, André Chénier, the last great product of the classic school. Tragedy, represented at its best by Crébillon and Voltaire, suffered from a similar dry rot; but comedy, on the other hand, maintained its vitality in the plays of Destouches, Piron, Marivaux, and Beaumarchais.

#### Innovations in Drama

The most significant feature in the history of the 18th century drama is the appearance of a new type of serious play, the *tragédie bourgeoise* or *drame*, in which the conventions of classic tragedy were repudiated and the truth of nature was sought. The way for this had been prepared by Marivaux and by the *comédie larmoyante* of La Chaussée but its founders were Diderot and Sedaine. This innovation was closely connected with the progress of the democratic

movement, the influence of which is also conspicuous in the further development of the novel in the hands of Le Sage, Marivaux, Prévost, Jean-Jacques Rousseau and Bernardin de Saint-Pierre.

While the Revolution overthrew the old social order, it did not at once destroy its art, and the literature of the revolutionary period represents in the main the final exhaustion of classicism. Two great writers, however—Mme. de Staël and Chateaubriand—herald the romantic movement of the second quarter of the 19th century. Romanticism, defined by Hugo as "liberalism in literature," was at bottom the result of the extension to art of the revolutionary principles of freedom and individuality; whence its rejection of classic convention and all external authority, its assertion of the right of genius to be a law unto itself, its extreme subjectivity, and its frequent extravagances; while the medievalism, picturesqueness, and emotionalism by which it was also characterised arose from a sweeping reaction against the scepticism and aridity of the 18th century.

The new note in poetry was first clearly struck by Lamartine, but most powerfully sounded by Hugo, the paramount personality of the entire movement. Vigny, Musset, and Gautier were others who were pre-eminent.

#### The Rise of Romanticism

Moribund classic tragedy was now displaced by a drama of the free romantic or Shakespearian type. Here the real pioneer was Dumas, but its principles were formulated by Victor Hugo in his preface to *Cromwell* (1827), the first great trumpet-call of romanticism, and it was his *Hernani* (1830) which assured its triumph on the stage. While, however, the glorified melodrama of Dumas had all the qualities which make for popularity, the finest art of the romantic drama must be sought in the plays of Vigny and Musset.

In fiction the historical romance, inaugurated by Vigny and Mérimée, attained enormous success with Hugo, Dumas, and a host of others, and side by side with this appeared the idealistic novel of George Sand in direct line from Rousseau's *Nouvelle Héloïse*, and the realistic novel founded by Balzac and Stendhal. Among the critics, Nisard held tenaciously to classical standards and methods, but the quickening and broadening influences of the time are clearly seen in Villemain and the

greatest of all French critics, Sainte-Beuve. The period was also rich in religious and philosophical literature, e.g. Joseph de Maistre, Lamennais, Cousin, and Comte; and in history, e.g. Thierry, Guizot, and Thiers.

By the middle of the 19th century romanticism had spent its force; the pendulum of taste swung in the opposite direction, and in response to new social and intellectual tendencies and the rapid spread of the scientific spirit, literature became for a time predominantly anti-romantic and realistic. The change is shown in the drama by the *comédie de mœurs* (a descendant of the later 18th century drama) of Augier and the younger Dumas; and the *drame naturaliste* of Becque and Mirbeau; in fiction by the *roman réaliste* of Flaubert and the brothers Edmond and Jules de Goncourt; and by the *roman naturaliste* of Zola, Maupassant, Daudet, Jules Vallès, and Charles-Louis Philippe.

Outside fiction, much of the prose of this period belongs to the literature of the particular subjects; but in Renan and Taine even specialised history was by the technical qualities of form and style raised to the highest level of art. Another noteworthy feature of the time was the immense development of criticism by many writers of striking merit, e.g. Taine, Brunetière, Gaston Paris, Julian, Scherer, Faguet, and Lemaitre.

W. H. Hudson

#### Parnassians and Symbolists

Poetry meanwhile passed through several well-defined phases largely associated, in consonance with the systematising habit of the French mind, with recognized schools. Two of Gautier's disciples, Banville and Baudelaire, mark the transition from the ideas of the romantics to those of the *Parnassiens*—Leconte de Lisle, Hérédia, Sully-Prudhomme, and others, who were broadly neo-classic in principle; and these in turn were succeeded by the *Symbolistes*. The acknowledged leader of symbolism was Verlaine, one of France's great poets. With him, Rimbaud, a young eccentric, wrote between the ages of 15 and 18 a few poems of fantastic brilliance.

Another young man, the insane Lautréamont, left a prose poem of hallucination from which surrealism was born 50 years later. Mallarmé composed a few rare and elevated poems whose refine-

ment of mystery completed the revolution of poetry. The other poets of the close of the 19th century have paled into insignificance, but of great importance was the Belgian school (*Le Jeune Belgique*) to which belonged a great creator, Emile Verhaeren, and Maurice Maeterlinck. A few isolated survivors of the romantic tradition were the novelist Barbey-d'Aurévilly, the esoteric dramatist Villiers de l'Isle-Adam, and the Catholic polemist Léon Bloy.

The 1890-1914 period is marked by two tendencies: first, a rational literature clearly written and comprehensible by the public at large, on which it left a deep impression; secondly, a literature of a very esoteric order.

The most typical writer of the first group is Anatole France, heir at once to the Parnassians, to Renan, and to the realistic novelists; the perfect representative of French irony, embodied in a classical style. With the same style Pierre Louys endeavoured to give life to decadent antiquity, while Charles Maurras applied it to a royalist and traditionalist ideology. In the opening years of the century the reading public was moved by the works of three novelists: Pierre Loti with his tender grace and enchanting nostalgia, Romain Rolland with his noble idealism, and Maurice Barrès, most artistic of the three, with his proud and troubled disillusion. Master of the psychological novel and inheritor of 19th century tradition was Paul Bourget, and a rare success was Alain Fournier's *Le Grand Meaulnes*, a novel of adolescence. Of the provincial school the ingenious writings of Jules Renard (*Poils de Carotte*) are notable for subtle humour. Outstanding in verse were Richépin and Mme. de Noailles; in the theatre the greatest triumph was that of Edmond Rostand (*Cyrano de Bergerac*, *L'Aiglon*).

#### Rise of the "Isms"

The second, more esoteric, group of writers gathered round Mallarmé. These young authors, who gained literary fame only after the First Great War, included Gide, Valéry, and Claudel. In poetry, the novel, and the theatre they introduced a philosophical type of lyricism which expressed the dramas and mysteries of the subconscious, and made of language and versification a supple instrument; but their obscurity was disconcerting to the general reader. Charles Péguy of

the *École normale*, a writer whose work is charged with misery and despair, alone in his time expressed an epic feeling in his *Mystère de la Charité de Jeanne d'Arc*. A philosopher whom Péguy acknowledged as his master, Henri Bergson, created in crystal style a new conception of the universe which brought fresh life to culture. This period saw an increase in the number of literary "isms": naturism, paroxysm, integralism, futurism, and, more interesting, the unanimism of Jules Romains, which revealed the latent lyricism of collective life and urban civilization.

#### Schools and Rebels

The schools of the 1914-1930 period were fewer but more influential; they included dadaism, surrealism, and populism. Great influence was exercised by the literary review, *La Nouvelle Revue Française*, inspired by André Gide; with the greatest writers of the day as its contributors, it laid down the law in the world of letters and became a fervent supporter of innovation. Its two first and greatest discoveries were Valéry and Proust. Valéry published *La Jeune Parque*, 1917, and Charms, 1922, a small collection of verse; his prose works, *Eupalinos* and *Variétés*, are examples of French intelligence in its most refined form. Proust's voluminous work *À la Recherche du Temps Perdu* introduced into the novel the hitherto unrealized wealth and splendour of the inner life. Gide's limp narrative set out the cruellest moral problems with frankness, while Claudel's poems and dramas revealed a cosmic inspiration of a greatness hitherto unknown in France. Innumerable young writers of undoubted talent followed these four masters, and the fruitfulness of this period made it one of the most magnificent of French literature.

In poetry, Apollinaire expressed in original verse an acute feeling for death; the Bohemian Max Jacob and the subtle Jean Cocteau made ingenious discoveries. The surrealists included Breton, Aragon, Tzara, and Éluard. Paul Morand wrote skilful novels in a dazzling, tinsel style. Far more refined were Giraudoux's prophetic utterances written for the stage. Followers of Gide were the more catholic Mauriac, whose *Désert de l'Amour* was one of the great novels of his generation; Montherlant, the champion of a sportive chivalry and misogyny;

Malraux, who exalts the ardour of revolutionary fighting; and Roger Martin du Gard, whose Thibault cycle gives a powerful picture of contemporary society.

Quite outside this literary school were the woman novelist Colette; Jules Romains, with his vast realistic fresco, *Les Hommes de Bonne Volonté*; Duhamel, a doctor best known for his Pasquier series of tales; and Bernanos, a poignant Catholic novelist. More widely read were André Maurois's biographies; Claude Farrère's adventure stories; Pierre Benoit's complex plots; Simenon's detective stories; and the war novels of Barbusse and Dorgelès. The naturalist school was developed more fully by Céline, whose *Voyage au bout de la Nuit* is sensational in its brutality, and others.

In the realm of criticism *La Nouvelle Revue Française* presented the most original group. Foremost were the philosopher Alain and the critic Thibaudet; next the pamphleteer Julien Benda, the critics Paulhan and Jean Prévost, and the philosopher G. Marcel. Independent and academic criticism varied from the literary journalists Sondag, Léon Daudet, and Théry, to learned scholars like the Abbé Brémond and Baron Seillière. History became more scientific than literary; nevertheless two historians were widely read, Bainville on the right and Mathiez on the left. The work of the Catholic philosopher Maritain had a profound influence.

#### Experiments in Drama

After 1914 the drama was the object of a variety of experiments, the *mise-en-scène* having been modernised and enlivened by Copeau, Jouvet, and others. Notable plays are those of the author-actor Jean Sarment, and of Lenormand who was inspired by Freud; but the greatest dramas were those of Jules Romains, especially *Knock*. Works worthy to endure were produced by writers who were not specialists in the theatre, Giraudoux and Claudel. Later authors, who showed a tendency to mix cynicism with fantasy, were Anouilh and Sartre, who was at once philosopher and novelist and leader of the existentialist school. The doctrine of existentialism (*q.v.*) with its emphasis on the individual, and human salvation by the force of the individual will, provoked violent controversy during the years of the French

resistance movement, and those immediately following the Second Great War. Its leading writers Sartre and Albert Camus (*qq.v.*) attempted to solve the separate problems of existentialism, its validity as a philosophy of life, and its claim to inspire an art. Camus's *L'Étranger* provided an important analysis of the negation of human values.

During the Second Great War French poetry found a new source of inspiration in the resistance movement. Aragon (*Crève Cœur* and *Les Yeux d'Elsa*), Paul Éluard (*Liberté*), Pierre Emmanuel (*Jour de Colère*), and Jouve are the heroic bards of the occupation.

Gustave Cohen

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**ART.** It is generally conceded that French art, more than that of any other country, reflects the national aesthetic judgement and feeling. Just as a Frenchman can be identified as such before he begins to speak, so is a French painting or piece of sculpture unmistakable by its particular qualities. For a long time, indeed, in the fine arts at any rate, the national quality overshadowed the personal; and though of late years the cosmopolitan spirit has affected French art like everything else, it is still true that the idiosyncrasies of individual French artists are much less remarkable than their mutual affinities.

The outstanding characteristic of French art is its high standard of competence. Nowhere in the world is so high a level of accomplishment reached. On the other hand, the predominant element in that competence is an intellectual one; and this leaves little room for spirituality such as is found in the best Italian work, or for the poetry inherent in a good deal of British art. The intellect of the Frenchman is clear cut, extremely logical, almost untouched by sensuousness,

and his art is endowed with precisely parallel qualities.

Hence comes his devotion for classicism. The main stream of French art has always been classic, whatever sporadic manifestations there may have been of other tendencies, romantic, impressionist, expressionist, and so forth. In no phase is the strength of the classic ideal more clearly shown than in architecture. French Gothic certainly had its own character and beauty, but it was a style imposed on France by the religious orders, and fostered by a temporary religious exaltation, rather than the product of the national genius. The great French cathedrals began to be built in the second quarter of the 12th century; but though these still remain as monuments to the period, Gothic, as a building style in France, had exhausted its strength before the end of the 15th century, and was extinct by the middle of the 16th.

#### The French Renaissance

The classic revival, spreading out of Italy, appealed at once to French national aspirations, and, first introduced into the country by Italian workmen, was quickly assimilated by the French builder-architects. This "French Renaissance" was the foundation of the classic style of building that has held the field in France, virtually without interruption, up to the present day, and, lasting from about the reign of Charles VIII (d. 1498) to the end of the 18th century, was an era of splendid accomplishment. The 16th century saw De l'Orme and Jean Bullant at work on the Tuileries, the 17th the building of the Royal Palace at Versailles, and the completion of the Louvre by Lemercier, as well as the career of François Mansart, one of the most individual geniuses of French and world classicism.

If the neo-Renaissance buildings of modern Paris seem paltry compared with the older masterpieces, it is not the less true that French architecture continues to exercise an immense influence on the building of other countries. The tradition of classicism, balance, perfection of form, justness of proportion, persists very palpably in this phase of French artistic expression, and no survey of other phases would be complete without reference to the general principles it so clearly embodies. The same principles reappear in the more permanent examples of French painting and sculpture.

French painting owed its beginnings to Flemish and Italian

artists, in the same way as French architecture was indebted to the Italian craftsmen. An attempt has been made by patriotic French critics to establish the existence of an important national school at Moulins towards the end of the 15th century, and the identity of the "Maître de Moulins," the painter of a well-known triptych at that town, with Jean Perréal, a contemporary artist of French nationality. But apart from the uncertainty surrounding the personality of this Primitive and others, it is difficult to trace any material difference between their work and that of the Flemings of the same time.

Even Jean Fouquet, the illuminator of the Chantilly Book of Hours, is credited with several paintings that are Flemish or German in character, and the School of Tours, in which he was the outstanding figure, seems to have been almost entirely directed by northern masters. In the art of Nicholas Froment, of the School of Avignon, who flourished in the third quarter of the 15th century, Italianate influences manifest themselves as well as those of the Low Countries. Jean Clouet (d. c. 1540) and his son François (d. c. 1572) were Netherlanders domiciled at Tours. Both became court painters and helped to carry on the Flemish manner as opposed to the Italian manner which was then being fostered by Rosso and Primaticcio in the decoration of the royal buildings at Fontainebleau. The most notable "French" artist of the Fontainebleau group was Jean Cousin (d. c. 1584), called "The French Michelangelo." Modern criticism however, has dubbed him a mediocre follower of Primaticcio.

#### Poussin and Lorrain

The Fontainebleau decorative school died rapidly, and shortly after the dawn of the 17th century French painting had passed out of the stage of apprenticeship and was evolving on vigorous and characteristic lines of its own. The principal foreign impulse came from Rome. It was there that Nicholas Poussin (d. 1665), the real founder of the Classical school of French painting, found his inspiration. Poussin's art, nevertheless, represents the most typical expression of the purely intellectual side of French genius. Based on a definite theory of design and composition, it is coldly classical, wholly unemotional. Even his landscapes testify his devotion to the severely classical ideal, though

they also show a genuine, if austere, love of nature. In landscape, however, he was easily surpassed by his great contemporary Claude Lorrain, who, adopting the same classical model in his combinations of both architectural and landscape elements, clothed his work in light and atmosphere. Ruskin said of him that he effected a revolution in art, which revolution "consisted mainly in setting the sun in the heavens"; and in this respect he was the founder of modern French, and, indeed, of all modern landscape art.

A variant on the severe classicism of Poussin and Lorrain was introduced by Simon Vouet (d. 1649) in the form of naturalism based on that of Caravaggio; and his pupil Charles Le Brun (d. 1690) succeeded in imposing on French painting a pompous character that checked for a time the growth of independent genius. This was the fruit of the minister Colbert's avowed policy, of which Le Brun was the instrument, of directing French art into industrial and decorative channels; and it was followed, in the 18th century, by a not unwholesome reaction.

#### Chardin, Fragonard, Watteau

Meanwhile, the genre painting of the brothers Le Nain, who flourished in Paris during the first half of the 17th century, had kept alive an older and simpler tradition than the Italian one. They painted the daily life of the people, very much in the manner of contemporary Dutch and Flemish schools, but with a certain southern grace in their realism. In much the same way Jean Siméon Chardin (d. 1779), an isolated figure among his flamboyant and sentimental contemporaries, concerned himself only with the aesthetic aspect and significance of the humble life he painted, and relied on delicacy of treatment and beautiful pigment to achieve beauty. French 18th century painting, however, as shown by Fragonard, Lancret, Pater, Boucher, and others, is essentially the mirror of the artificial mode of life and thought that had followed the heaviness of Louis XIV's reign. J. B. Greuze painted genre with a certain naturalness that did not enter into the sham shepherd and shepherdess compositions of the rest; but even he is not free from the charge of sentimental affectation. Watteau's temperament gave a seriousness to his *Fêtes Galantes*, which renders them unique of their kind.

The basis of this irresponsible and momentarily charming art

was Classicism. But it was covered with a pseudo-romantic veneer. The sculpture of the time partook of the same character; that is to say, its aim, first and last, was to please. French sculpture in the Gothic period was entirely subordinate to architecture. The Renaissance emancipated it, only to confine it once more within the rigid classicism of the 17th century. Then came the Bernini influence, and a host of rococo imitations of that Italian master. Seemingly the Revolution was needed to bring about a further emancipation both in painting and sculpture. For the first, this event produced Jacques Louis David; for the second, Houdon. David's classical formula was cold and repellent, and his historical compositions are bombastic; but the famous unfinished *Mme. Récamier* reveals the artist unchained from his conventions. Houdon was the first of a long line of French sculptors who, while working at first on the Greek and later the Renaissance models, designed with personal freedom and feeling. David d'Angers, Rude, Carpeaux, and Barye are names that most readily occur in this distinguished sequence, which, lasting throughout the 19th century, was only interrupted—roughly, perhaps—by the advent of Rodin.

In painting, the dull and lifeless classicism of David and his school waned in the early years of the 19th century. The Romantic movement of 1830 virtually demolished it. Romanticism, of course, was not confined to France, and was as much a literary movement as an artistic one; but it exercised an enormous influence on the future development of French painting. Headed by Eugène Delacroix and Théodore Géricault, it took the form of a revolt against the abstract and impersonal character of Classicism.

#### The Barbizon Group

It was an awakening to the objects of the external world, to the relations of those objects to each other and to their environment. In pure landscape it made possible the emergence of the Barbizon group, of Corot, Rousseau, Daubigny, Millet, and the rest, who in their turn became the forerunners of the Impressionists. Romanticism, in short, was the beginning of the sharp cleavage between academic and independent art which still persists. J. A. D. Ingres and, in a different way, Puvis de Chavannes, were the principal stalwarts of the Classical reaction that made itself

felt from time to time during the century; on the other side, Manet, Degas, and their Impressionist followers bore the brunt of an official persecution bitter enough to act as a tonic to men with new ideas.

As the century drew to a close, the development of French independent painting accelerated its pace. Claude Monet, once acclaimed as the last word in modern art doctrine, lost his supremacy, through the rise of a new group—the Post-Impressionists.

This movement, commonly attributed to Paul Cézanne, Vincent van Gogh, and Paul Gauguin, is described under a separate heading.

F. J. Maclean

**ART SINCE 1900.** In the opening years of the century academic tradition reigned supreme. Its practitioners produced society portraits, subject pictures, military or costumed subjects, historical displays and pageants, decorative work in town halls. The academicians of the *Société Nationale des Beaux-Arts* were more liberal; they included the ether *Heileu* (1859-1927), the painter of Breton subjects, Cottet (1863-1925), and, best known, Forain (1852-1931), whose caustic depicting of society manners in the tradition of Degas remains the most original work of this school.

#### The "Modernist" Movements

In contrast, the "modernists" or innovators adopted and adapted all that the academies rejected, finding inspiration in the sculptors of old, the Gothics and Aegeans, also the Hindus, Africans, and Oceanians, as well as in primitive or eccentric painters like El Greco. They followed in the wake of the great revolutionary artists of the late 19th century who, almost unknown before 1900, belong to the history of 20th century art. They revered especially Cézanne as the master of "authentic" painting, but the last works of Renoir (those from 1900 to 1919) and those of Cagnes played an important part in orientating their art. Amongst the neo-impressionists, the "pointilliste" technique of Seurat (1859-1891) had been influential, while strength of brush-work was the contribution of Toulouse-Lautrec (1864-1901). Dream hallucinations were transposed on to canvas by a subtle artist and man-of-letters, Odilon Redon (1840-1916).

By 1910 three groups of outstanding importance were established: the Symbolists, Fauvists, and Cubists. The first mark a reaction against the objective,

analytical, and clearly-expressed art of the Impressionists. Their founder was Gauguin, and its theorists were Sérusier (1865-1927), a mystic, and Maurice Denis, a great religious painter whose frescoes represent the peak of 20th century decorative painting. Vuillard (1868-1940), painter of cosy interiors, and Bonnard (1867-1947), creator of homely visions abounding in rainbow colours, were men of high talent.

The Fauvist school, which received its name in 1905, laid emphasis on expression, intensity of sensation, and temperament. Taking inspiration from Cézanne and Van Gogh, and reacting against all intellectualism, it instituted the cult of pure colour. Its champions were Matisse, Dufy, Vlaminck, Derain, Marquet, Friesz, Van Dongen, and Rouault. From the last derives the French tendency towards expressionism.

#### The Modern Movement

The third school, Cubism, founded in 1908, was the most revolutionary. Its object was to depict volume—rejecting light and colour and reducing everything, even the human face, to cubes and cylinders. Its intention was to substitute intellectual truth for the deformation of the senses, whence its multiplicity of warped perspectives—objects seen full-face and in profile at the same time. This school is represented principally by the Spanish painters Picasso and Juan Gris, and the French artists Braque, de la Fresnaye, Léger, Delaunay, and Lurçat. The square-ruled compositions of Jacques Villonpan were much appreciated about 1940 by a new Cubist school which took up the quest of 1910. Marie Laurencin sketched feminine groups in pinks, blues, and greys, which curiously combine perversity and freshness.

Surrealism, coming after the First Great War, was above all a literary and philosophical school, and almost all its representatives in painting were foreigners resident in Paris. Their investigations were directed not towards new techniques but weirdness and systematic horror in subject matter, in particular the dream world, where they sought to rediscover the freshness and "purity" which they declared to have been dissipated by the intellectualism and conformism of civilization. The Italian Chirico launched the movement and, with his successors, affected a glossy, painstaking style. The best known of these is the Spaniard Salvador Dali. Max

Ernst and Tanguy cultivate apocalyptic dream styles. Others, such as Joan Miro, Masson, and Arp, show touches of abstract art. Lastly, Lurçat and Contaud became interested in tapestry.

The pioneers of art gave attentive curiosity to children's art, the art of eccentrics and of the Oceanic savages, and popular art. Apollinaire and Picasso brought to light the customs official Henri Rousseau (1844-1910) whose views of city suburbs and docks, exotic compositions, and bright colours used in primitive style, scandalised the public.

**EXPRESSIONISM.** Many talented artists, after passing through or skirting Fauvism and Cubism, attached themselves above all to expression, whence the name Expressionists sometimes given to some who came into prominence in the 1920s. They had a love of sober tints and crude caricature-like figures, as in the works of Gromaire, Yves Alix, and Georg. Certain artists delighted in working the thickness of the paint, e.g. Bouche, whose canvases stand out in clear relief. Others, like Dufresne, became attached to a strange type of arabesque. But far above these artists is Dunoyer de Segonzac, master of rich thick colouring and a sumptuous green style; his most notable compositions are broad landscapes painted with great depth and intensity. In contrast to these sombre painters, others delight in depicting the sunny open air. Laprade obtained a lasting success with his light and verdant arabesques. Puy, Manguin, and Favory lay special emphasis on the charms of the feminine figure. More originality is shown by the pure landscape painters—notably Utrillo, who gets on to canvas the very soul of Montmartre. His portrayals of the suburbs of Paris and of village churches reveal perfect intimacy with their atmosphere and suffice to class him as the greatest painter of city life.

**ENGRAVINGS, POSTERS, AND DÉCOR.** French art has always been attached to design, which in the 20th century took the form of illustration, prints, and sketches. In this sphere the naturalist or academic traditions are found at their best in Forain and Sem. Several of the most famous artists, Matisse, Picasso, Segonzac and Dufy, are remarkable for their lithographs, etchings, sketches, and water colours. Amongst those specialising in engraving, new styles were created by Laboureur

and Louise Hervieu. The poster and theatrical décor acquired an artistic value hitherto unknown. The genius of Toulouse-Lautrec and Bonnard, and the prolific and brilliant work of Chéret and Cappiella, gave birth to the poster. Décor was brought up to date by the intelligence and venturesome spirit of the Russian ballet, whose producer Diaghilev employed first Bakst and later such famous artists as Picasso and Derain. His example was followed by almost every theatre. Among the artists who specialised in stylised settings must be mentioned Touchagues and Christian Bérard.

**SCULPTURE.** In this period sculpture was far less successful than either painting or drawing. There were as in painting two opposing schools: academic and independent. The only noteworthy representatives of the former are Bartholomé, Landowski, and Bouchard. The independents succeeded in creating a style that rediscovered the great sculptural traditions of the pre-Renaissance era, the Middle Ages, and Ancient Greece. After the magnificent work of Rodin (1840-1917), his successors, several of whom had worked in his studio, reverted to the direct dimensional figure with beautifully expressed attention to volume; they include Bourdelle (1861-1929) and Joseph Bernard (1866-1931). But the artist who towered over 20th century sculpture was the Mediterranean Aristide Maillol (1861-1944). A painter until he was forty, he became after that a sculptor of female figures whose smooth grace and freshness, at once supple and generous, equalled in poetical expression the finest works in the French tradition.

#### Weird Arabesques

Despiau (1874-1946) devoted himself to portraiture, in which he was unrivalled. A pioneer school pursued a subtle line of research in geometrical planes and volumes, producing weird arabesques in which occur wood-shavings and bundles of wire; Henri Laurens, Zadkine, Brancusi. Lastly must be noted the sculpture of the painters Picasso, Modigliani, and Matisse.

**ARCHITECTURE.** At the beginning of the century official architects wasted their talents on imitations of the past, but there appeared a number of creative spirits who made use of new materials and methods such as reinforced concrete, rationalising methods of construction in accordance with the needs of living con-

ditions and social usages, providing wider openings, suppressing roofs, increasing the number of balconies, utilising fresh ideas of decoration. The most illustrious of these innovators were the brothers Auguste and Gustave Perret who, in the Théâtre des Champs Élysées in Paris and in the church of Raincy provided models of a new pure style. Tony Garnier in Lyons, Mallet-Stevens, Louis Sue followed in this new

path. Lurçat and, above all, Le Corbusier, pushed the process of simplification even further. In every domain, 20th century French art was marked by two tendencies of the period: the never-ending search for technical invention, of an audacity prone to overreach itself; and a depth of inspiration, in which appeared the constant desire to express both the physical and the spiritual life of mankind.

Gustave Cohen

## FRANCE: SECOND GREAT WAR & AFTER

Georges Gombault, French Political Journalist and Broadcaster

*The internal civil history of France from Sept., 1939, is described in this section. For military history, see British Expeditionary Force; Europe, Liberation of; France, Battle of; Maginot Line; Paris, etc. See also biographies of Pétain; Laval; de Gaulle, etc.*

From the beginning of Nazism in Germany, far-seeing minds in France predicted that it would lead to war. This feeling was confirmed when, in the spring of 1936, Hitler reoccupied the Rhineland. Some Frenchmen declared for a policy of firmness, others inclined towards appeasement. In the first camp were patriots anxious for the future of the country and republicans who wished to defend democracy against Nazism. In the second were men of good faith who believed sincerely that Hitler could be appeased by concessions; but the party also included adversaries of the republic and of social reform who were prepared for the German dictator to put their country in order.

### The Forces of Defeatism

Hitler, applying the methods set out in *Mein Kampf*, employed many agents in France to develop this latter tendency, the pretext being pacifism. Social and political circles, journalists, and syndicated papers were especially worked upon under the direction of Otto Abetz. A Franco-German committee was set up, presided over by Fernand Brinon, who eventually became the Vichy govt.'s ambassador to the Germans in Paris. Belin, a secretary of the Confédération Générale du Travail, who became one of Marshal Pétain's ministers, endeavoured to ruin the spirit of resistance among the workers. Defeatism had its adherents in all classes and even in government councils. The collaborators triumphed, after the Munich agreement, 1938, when the foreign minister, Georges Bonnet, received Ribbentrop at the quai d'Orsay.

In spite of these efforts, France followed Great Britain in declaring

war on Germany on Sept. 3, 1939, two days after the invasion of Poland. But the defeatists did not give up their attempt to sap the nation's morale. Moreover, communist workers in the armament factories, who had opposed Hitlerism and Fascism, changed their attitude after the conclusion of the German-Soviet pact of non-aggression, Aug., 1939. The first months of hostilities were calm. During the attack on Poland, Gen. Gamelin, the commander-in-chief, conducted a small offensive by the army of Alsace, but the troops were soon withdrawn to their bases, and only minor operations, by volunteer units, the "free corps," took place. The Maginot Line was occupied, and work was begun on the fortification of the unprotected N. frontier. Angered by the understanding between the U.S.S.R. and Germany, most Frenchmen registered their sympathy when Finland was attacked by the U.S.S.R. Édouard Daladier, the prime minister, accused of weakness, was replaced by Paul Reynaud in March, 1940. The latter at once signed with Great Britain a pact agreeing that there would be no separate peace, and when Norway was invaded in April, organized the French share of the expedition to that country.

### The Military Defeat

On the night of May 9-10, 1940, the German army invaded Belgium and the Netherlands, and Gen. Gamelin sent his armies to meet it. But on May 15, German divisions crossed the Meuse at Sedan, at a point which had not been fortified; this was the beginning of the destruction of the armoured divisions in the direction of Amiens. The troops were demoralised by a kind of war for which they had not been prepared.

The combination of tanks and aeroplanes disconcerted them, the thunderous noise of pursuing machines terrified them. There were many acts of heroic resistance; armoured divisions, notably that commanded by Gen. de Gaulle, fought valiantly. But in the main it was full flight in front of German tanks, which drove them far from their bases.

Reynaud relieved Gamelin of his command, replacing him by Gen. Weygand. But the Germans reached the North Sea and the Channel, occupied Normandy, and on June 14 entered Paris, which had been declared an open city the day before. The French army was cut in pieces; the higher command was no longer in contact with the main forces, and general staffs were cut off from the troops. On the roads, the population of the overrun areas, and many Parisians, fleeing southwards from the invasion, mingled with and obstructed the military convoys. Amid the chaos the unarmed crowds, with old people, women, and children in the majority, were machine-gunned from aircraft.

### The Armistice of 1940

When Sedan fell, Gamelin had informed the government that he could no longer guarantee the safety of Paris, and the government proposed to leave the capital. The chamber sitting that day refused to leave, and the official exodus was adjourned. But by June 10, when Paris was immediately threatened, the government and all public services had moved to Tours.

At a cabinet meeting in the neighbourhood of this town, Weygand asked the government to seek an armistice. Reynaud, supported by the majority of his ministers, refused; he told the general that the army could capitulate, but this solution was expressly rejected by Weygand. The premier consulted with Winston Churchill, who had arrived by air. Convinced that Great Britain, in the present state of her forces, could no longer give immediate help, Reynaud asked Churchill to release him from the engagement not to seek a separate peace. Churchill did not insist on strict fulfilment of the agreement, but imposed the condition that the French navy should not be surrendered.

With the Germans hard on their heels, the government moved to Bordeaux. Weygand now insisted on an armistice, and Pétain, who had been appointed vice-premier on May 18, gave him full support,





1. German parade past the river carriage in which the armistices of 1918 and 1940 were signed at Compiègne. 2. Oradour-sur-Glane: church in which the women and children were burned to death, June, 1944. 3. Pétain's motto, *Patrie, Famille, Travail*, taught in school. 4. Pétain, Darlan, and Laval outside their

seat of government at Vichy 1942. 5. Germans, with white flag, on the balcony outside the chamber of deputies, Paris, Aug., 1944, discuss surrender with the F.F.I. 6. Gen. Leclerc, commander 2nd French armoured div., reaches the Boulevard Montparnasse Paris Aug. 25 1944

# FRANCE 1940-44: ARMISTICE—OCCUPATION—LIBERATION



threatening otherwise to resign. Reynaud again resisted, being supported by Georges Mandel, minister of the interior, and several others. It appeared that certain divisions were still intact; but Weygand alleged that the Communists had established a revolutionary government in Paris, and that he must reserve these divisions for re-establishing order. Mandel ascertained by telephoning the Paris prefect of police that this was not true, but Weygand, supported by Pétain, still insisted. By way of negotiation, Camille Chautemps, deputy premier, proposed that the Germans should be asked for their armistice terms, which could be refused if found unacceptable. Reynaud, Mandel, and others objected that, once an armistice had been asked for, it would be accepted, and counter-proposed that the war be continued from N. Africa.

The cabinet was inclined to support Chautemps, which would have satisfied Weygand and Pétain. Reynaud, finding his new proposal unacceptable to the majority, handed the resignation of the cabinet to President Lebrun June 16. Pétain was charged with the formation of a new ministry and was barely in office before he asked Hitler for an armistice, through the Spanish ambassador. Hitler delayed his reply and advanced his troops as far as the gates of Bordeaux, which was severely raided from the air. Pétain begged for a reply from Hitler, who replied that he might send plenipotentiaries who would be in a position to discuss the armistice. They duly met the German delegates in the forest of Compiègne, where Hitler laid down his conditions on the spot where Foch had received the plenipotentiaries of defeated Germany in Nov., 1918, and in the same railway coach, which Hitler had had sent from Paris.

The armistice was signed, June 22. It was severe: France was bereft of Alsace and Lorraine, subjected to a daily tribute of 500 million francs (about £2,800,000 at the then rate of the franc) for the upkeep of an army of occupation

within a defined area corresponding to about half of the country, and required to pay other charges.

Lebrun had expected to leave for Algeria, with the government and parliament, on the assumption that the navy and what remained of the army would rally in N. Africa. But Laval staged a violent scene with the president. Individual members of parliament, including Mandel, who had embarked for Morocco, were arrested. The govt. itself refused to go to N. Africa, preferring to remain in France and carry out a policy of submission to the Germans.

**THE VICHY GOVERNMENT.** At Vichy, to which Pétain's government moved on June 30, Laval, now vice-premier, asked the cham-

nation. In "Vichy" France the individual had no security, for by a simple order of a prefect anybody could be interned; newspapers were subject to the strictest censorship, instructed to write about certain subjects, and told where to place the articles and the sizes or the headlines; democratic associations like freemasonry and the league of the Rights of Man were forbidden and robbed of their funds; racial legislation was established (French Jews were excluded from the administration, forbidden to practise any profession, and had their property and businesses seized); syndicates were forbidden, and a so-called charter of work set up a kind of cooperative movement on the fascist model.

The leaders of the Left and the most ardent patriots were arrested and interned, including Léon Blum, Vincent Auriol, Mandel, Daladier, Reynaud, Léon Jouhaux, and later Edouard Herriot. Former Radical or Socialist ministers were condemned to severe penalties. Dornoy was assassinated by the Cagoullards, members of a terrorist organization of the extreme Right, whom he had exposed in 1937 when minister of the interior. Proceedings were taken against Blum, Daladier, Gamelin, and several associates, who were brought to trial at Riom in 1940. But the accused became



France. Map showing the occupied, unoccupied, and demilitarised zones in France after the signing of the Armistice with Germany, June 22, 1940, until November 11, 1942

her and the senate, met in national assembly, to give Pétain full power to modify the constitution. A few deputies and senators tried in vain to oppose the motion, which aimed at the suppression of the republic. Laval's agents threatened opponents with arrest, and gave warning that in the event of continued opposition the generals would step into power. Full powers were granted to Pétain, only 80 deputies and senators opposing. The marshal proceeded to take total power; he abolished not only the reality of the republic, but also its name and motto, substituting the title of French State and the motto Work, Family, Fatherland. After suppressing both chambers, he instituted a national council of his own nomi-

accusers, and so clearly exposed the responsibility of the generals and the champions of the new régime that the proceedings were abruptly stopped and the accused imprisoned in Le Portalet, an unhealthy fortress in the Pyrenees. Most of them were later sent to camps in Germany.

The Vichy government also tried to organize their followers on the German and Italian models. Pétain created the *Legion Tricolore*, which members of various dissolved ex-servicemen's associations were compelled to join. The government also opened workshops where all youths of 20 had to spend several months instead of being on military service, receiving physical training and indoctrination. At Uriage there was a

selective school, which was to form the *élite*. In the primary schools and in colleges teachers were continually invited to adulate Pétain, but often declined. In the youth camps and even at the selective school the resistance had many followers. Propaganda for Pétain produced a contrary effect to that which was intended. Few believed in the myth of the national revolution.

#### France Divided into Three Zones

After annexing Alsace and Lorraine, the Germans divided France into three zones: (1) the forbidden zone of the N., which was cut off from the country and formed part of Belgium; (2) the occupied zone, which ran from the Swiss frontier to Bordeaux and from Bordeaux to the Spanish frontier, and took in all the W. coast; (3) the so-called free zone outside (2). The passage from one zone to another was possible only with German permission. Paris was in the occupied, Vichy in the free zone; the government resided at Vichy and made de Brinon ambassador to the German authorities in Paris. Vichy policy was that of collaboration with Germany. In July, 1940, the foreign minister, Paul Baudouin, repudiated the alliance with Great Britain. On Oct. 22, Hitler received Laval, and on Oct. 24 Pétain, whom he asked for help in Africa, "against Great Britain and Gen. de Gaulle." According to a statement made later by de Brinon, the marshal consented. On Oct. 28, Laval became foreign minister, and two days later, in a message to the French people, Pétain declared: "It is with honour and to maintain French unity in the framework of constructive activity of the new European order that I am today entering into collaboration."

At Pétain's trial in 1946 it was alleged that on Dec. 23, 1940, he had broken with Laval, and had even had him arrested. But Laval's successor, Admiral Darlan, also visited Hitler and placed himself under his orders, and Pétain recalled Laval as soon as Berlin expressed the wish that he should do so. The marshal raised no objection when Gen. von Stulpnagel, in command of the occupation army, ordered the massacre of hostages or when the Germans, in violation of the armistice terms, occupied the whole of France, Nov. 11, 1942. On the contrary, he stigmatised resisting Frenchmen as terrorists; encouraged the formation of such bodies as the "league of anti-bolshevik volun-

## POPULATIONS abandonnées.



France. A German poster in occupied France calling upon the French people to "Have confidence in the German soldier"

teers," who fought in German uniform; received Doriot, a fascist who was fighting in the German ranks; and appointed Darmand, virtually his minister of the interior, chief of the militia created by the Germans to help the Gestapo. Nor were the ministers less enthusiastic. Darlan gave every assistance to the Germans during the Syrian campaign; Laval represented the "voluntary" removal of French workmen to the Reich as an advantageous measure, since it would lead, according to German promises, to the repatriation of prisoners, of whom there were more than a million and a quarter, and enable France to take her place in the "new Europe." The Vichy government was a mere tool of Berlin, and when in 1944 the Germans fled before the Allies, Pétain, Laval, and a group of partisans followed them as far as Sigmaringen.

THE RESISTANCE. Stupor was the first effect of the armistice, followed by indignation. It was in London, where a broadcast appeal was made on June 18, 1940, by Gen. de Gaulle, that the first core of resistance was formed in the Free French (later renamed Fighting French) forces. Volunteers became the nucleus of a small army, a fleet which cooperated with the Royal Navy, and an air force whose pilots flew with the R.A.F. In France resistance developed first among the intellectuals—Paris students demonstrated Nov. 11, 1940—and among those of the political Left, while those

of the Right, together with the dignitaries of the church, followed Pétain, though there were exceptions on both sides. Broadcasts from Great Britain brought great comfort, and "Gaullism" became synonymous with patriotism.

Organized resistance began in the winter of 1940-41; it took three forms—helping British and French men and women to escape from France; giving information to Great Britain; and editing, printing, and distributing clandestine tracts or newspapers to enlighten opinion. The movement was particularly strong in the N. The Germans savagely repressed it. Scientists of the Musée de l'Homme, Paris, a centre of resistance, were arrested and shot. But the movement grew, and gradually its various branches adopted symbolic titles, e.g. *libération, combat, franc-tireur*. Activities became more and more military, and later the civil and military organization and the National Front were formed. Only after June 22, 1941, however, the day of the German attack on Russia, did the Communists adhere to the resistance movement; they were especially active in sabotage and in the Maquis.

Relations were early established between the movements in France and in London, where de Gaulle had formed a national committee in June, 1940. In June, 1943, the French committee of national liberation, at first under the joint presidency of de Gaulle and Giraud, later under de Gaulle alone, was set up at Algiers, and in Aug. was recognized by the Allies as exercising authority over the territories which acknowledged it.

Collaboration between all sections of the resistance movement inside France led to the formation of the national council of resistance. Its first president, Jean Moulin, was arrested, tortured, and killed by the Germans; the second was Georges Bidault, who became head of the shadow provisional government in France. In his council were Socialists, Communists, Radicals, popular democrats, members of the democratic alliance, the republican federation (Louis Marin's party), the Confédération Générale du Travail (trade unions) and the Confédération Générale des Travailleurs Chrétiens (Christian workers). The council drew up a political programme which went far to the Left and was the basis of measures taken by the provisional governments after liberation.

The Gestapo arrested, imprisoned, tortured, and killed many

members of the resistance; hundreds of thousands were placed in concentration camps or prisons in France and sent from there to death or to Germany. Jews were sent to the gas chambers. Other savage measures were the massacre at Chateaubriant, Oct. 22, 1941; the execution of Gabriel Péri, a Communist deputy handed over by Vichy Dec. 15; the assassination of writers, scientists, and professors such as Jacques Decour, Pollitzer, Jacques Solomon, Jean Cavailles; the razing of Oradour-sur-Glane, June 10, 1944. Seeking auxiliaries, the Germans created the militia which organized punitive expeditions against the Maquis and committed many individual crimes. Two former ministers, Mandel and Jean Zay, were killed; so were the 80-year-old president of the league of the Rights of Man, and several senators and deputies. In 1944 the Gestapo started a new campaign, arresting members of parliament, journalists, and officials whose patriotic sentiments were known; many died under torture. French victims of the German repression must be counted in hundreds of thousands.

**THE LIBERATION.** June 6, 1944, marked the beginning of France's deliverance. At the same time as the Allies disembarked on the Normandy coast the order to rise was passed to the Maquis troops, under the command of Gen. Koenig; they cut enemy communications, creating confusion in the rear. (For the course of the fighting, see Europe, Liberation of.) On Aug. 15 a U.S. army, including French troops which later formed the basis of the French 1st army, landed in the S.; these were also helped by the Maquis, who came into action in the Alps, the Cévennes, and the Jura, destroying railway lines and attacking the enemy; in Savoy the Forces Françaises de l'Intérieur (F.F.I.) took 18,000 prisoners. Thus the German army was caught between the Allied forces in the N. (the French 2nd armoured division, under Gen. Leclerc, forming part of the U.S. 3rd army) and the U.S. and French armies in the S.

By Aug. 19 revolt was stirring in Paris. The F.F.I. came into action and erected barricades. The police went on strike. The police headquarters and the town hall, seat of the national council of resis-

tance and the Parisian liberation committee, were the patriots' headquarters; the Germans used tanks against these buildings. When the fight spread to all quarters the enemy tried to fire the Grand Palais. The poorly-armed insurgents had begun to reach the end of their tether when on Aug. 24 at 9.30 p.m. the first elements of Leclerc's division, to whom the Allied high command had given the honour of completing the liberation of Paris, arrived at the gates of the capital. The next day the full division cleared Paris, the German general signing his sur-



France. Clandestine newspapers which members of the French resistance movement printed and distributed in secrecy and at great risk during the German occupation of their country, 1940-44

render at the Montparnasse station and handing over to Leclerc and Col. Rol-Tanguy, chief of the F.F.I. On Aug. 26 de Gaulle entered Paris; acclaimed by the populace, he went to Notre Dame, where snipers in its galleries and on the roof of the town hall fired at him.

The greater part of France was free by Sept. But the enemy still occupied Alsace, and the Germans were still resisting in invested "pockets" at La Rochelle, St. Nazaire, Lorient, and Dunkirk. The French 1st army, commanded by Gen. de Latre de Tassigny, in cooperation with the U.S. 7th army, took the offensive on Nov. 14, captured Belfort, turned the German positions in the Vosges, and forced a general retirement in Alsace. The French 2nd armoured div., operating now with the 7th army, forced the Saverne gap, entering Strasbourg on Nov. 23. During the enemy counter-offensive in the Ardennes (Dec. 1944-Jan., 1945), the Americans wished to withdraw to the Vosges, but at the urgent

request of the French, Gen. Eisenhower decided that Strasbourg should be held. By the end of March, 1945, French soil was clear, except for the invested ports, whose garrisons surrendered only after the German capitulation in May. By May 17, 1945, all Germans remaining in France had been made prisoner. A French army of ten divisions had played its part in the deliverance and the help of the F.F.I. was estimated by S.H.A.E.F. at 15 divisions.

**THE FOURTH REPUBLIC.** The republic was again proclaimed on the day Paris was liberated, Aug. 25, 1944, and republican legislation again came into effect. De Gaulle remodelled the provisional government, over which he had presided in Algiers since 1943; war destruction having made communication with the provinces difficult, republican commissioners, armed with full powers, represented the government in the various regions. Advising the government, on which all parties and the National Resistance Council were represented, was the consultative assembly, whose members were appointed by the resistance committee. The first task was to re-establish communications, organize revictualling, and bring order into a country thoroughly ravaged by four years of occupation, two military campaigns, and frequent bombings of installations and communications.

In the early days there were summary executions of those who had collaborated with the Germans; but justice soon intervened and the most notorious collaborators were taken before proper tribunals. Administration, journalism, and the world of letters and art were systematically purged; economic collaborators and illicit profiteers had their gains confiscated. Of 8,348 summary executions, 5,234 were before liberation; 1,325 were executed after trial by irregular courts, 82 after courts martial. Of 2,853 (including Pétain and Laval) condemned to death by courts of law, only 787 were executed. Of the 38,266 others who received prison sentences, all condemned for minor offences were amnestied in 1953.

During 1945-46 France lived under provisional governments. On Oct. 21, 1945, a constituent assembly was elected, whose prin-

principal purpose was to draw up a new constitution. The Communist party secured 150 seats, the Socialists 139, a new party, the Mouvement Républicain Populaire (Catholic and democratic), 149. The Radicals won only 25 seats. The constitution it proposed was rejected, May 5, 1946. On June 2 a new constituent assembly was elected, wherein the M.R.P. (167) was most numerous, Communists (153) next, then the Socialists. The constitution (see pp. 3510-11) drawn up by this assembly, was accepted by the country with a weak majority, Oct. 13. In addition to drawing up a constitution, the assemblies had carried out nationalisation of mines, gas, electricity, insurance, and the big credit banks.

General de Gaulle, at variance with the constituent assembly both over constitution-making and foreign policy, had resigned, as head of the provisional government, Jan. 21, 1946; Guoin, the Socialist president of the assembly (a position approximating to that of the speaker of the house of commons), succeeded him, Jan. 26. He supported the constitution which the country rejected, and resigned after the election of the second constituent assembly. Georges Bidault, leader of the M.R.P., came in on June 23, and himself retired according to custom when the new national assembly started to function, Nov. 10. It proved difficult to form a ministry. Neither the M.R.P. nor the Socialists wanted to collaborate with the Communists. Finally, pending the election of the new president of the republic, Blum formed a Socialist ministry; its life was known to be limited to six weeks, but it gave a vigorous direction to policy. On Jan. 16, 1947, Vincent Auriol was elected first president of the Fourth Republic by the two assemblies sitting at Versailles; and Blum handed his resignation to the president. During the next ten years France had 18 different governments; the longest lasted 50 weeks, the shortest two days. All were uneasy coalitions; all were faced with acute problems: the fall in the value of the franc, the rise in the cost of living, evasion of taxation, wars costly in money and lives in the colonies.

Indo-China, Laos, and Cambodia were lost in 1954; Tunisia and Morocco in 1956. Unrest in Algeria burst into violent rebellion in 1954, still active in 1957. But through all these difficulties, reconstruction of war-devastated France went on; and the country played its part in the movement leading to Western Union, as signatory to the treaties of Dunkirk and Brussels and the North Atlantic Treaty, and as a member of N.A.T.O.

**France, BANK OF.** Central bank of France, founded in 1800



Bank of France. The head offices in Paris

by Napoleon I and having the monopoly of issuing notes. It exercises a large measure of control over other banks in France, most of which have been nationalised and was itself completely nationalised in 1946. It has a number of provincial branches and a large share in the clearing arrangements of the country. Its head offices are in the Rue de la Vrillière, Paris.

**France, BATTLE OF.** Name popularly given to the fighting between the German and (mainly) French armies which lasted until the end of organized French resistance in June, 1940. On May 15, 1940, German mechanised columns, advancing with a speed hitherto thought impossible in warfare, forced crossings over the Meuse at Dinant and between Sedan and Mézières, and totally destroyed Gen. Corap's 9th French army. At first there was some doubt whether the enemy would push on to Paris, take the Maginot Line (*q.v.*) in the rear, or thrust W. to sever the communications of the Allied armies in Belgium. The German command decided on the latter plan. For the campaign that followed ending with the evacuation of the B.E.F. and 1st French army from Dunkirk, see British Expeditionary Force; Dunkirk, Evacuation from. See also Belgium in the Second Great War; Netherlands in the Second Great War.

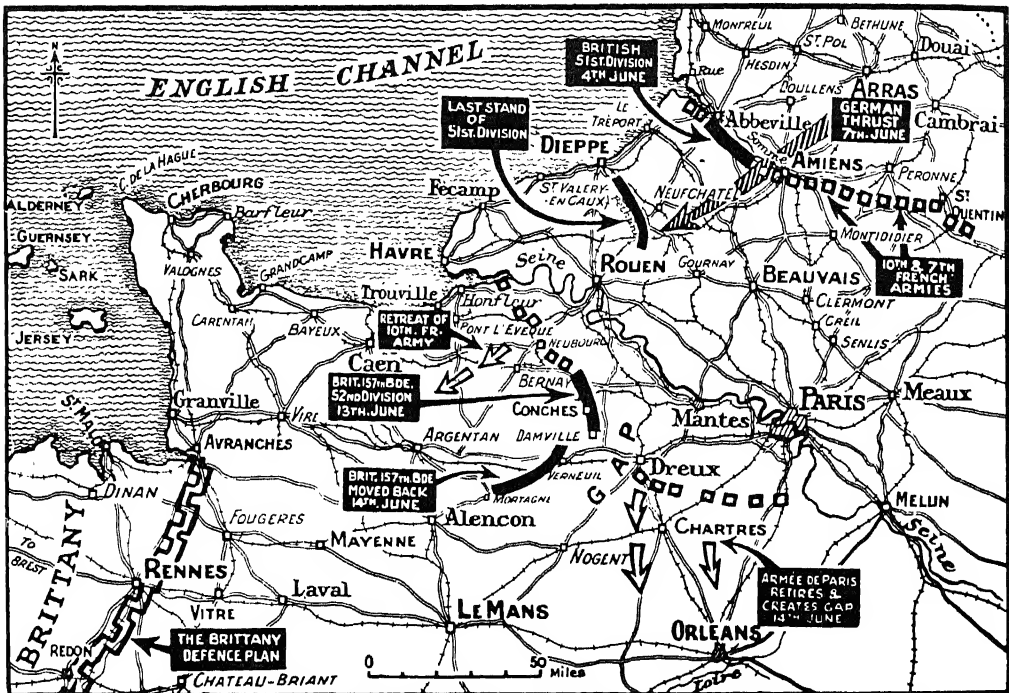
After the Allied evacuation from Dunkirk the German command was able to throw its full strength against the French, and on June 5 launched armoured and motorised infantry thrusts which in less than two weeks totally defeated the armies and put France out of the war.

When Gen. Weygand replaced Gen. Gamelin as c.-in-c. on May 19, he had considered mounting a major counter-attack against an enemy whom he felt sure must halt to reorganize after the battles in Flanders. But by the beginning of June, Weygand lacked the necessary support of armour, artillery, and aircraft. Even had such support been available, the disruption of his communications by air attack and the chaotic condition of French rail and road transport, due in large measure to the disorderly fleeing of refugees, made it impossible to concentrate men and materials for an offensive operation. Moreover, the Germans did not halt to reorganize; despite the length of their communications and the opposition they had met in Flanders, their advance had lost none of its momentum.

#### The Weygand Line

Weygand managed to establish a defensive line across France from the Somme estuary to Montmédy, where the Maginot forts had successfully withstood all German attacks. The "Weygand line," which followed approximately the course of the Somme and Aisne and their interconnecting canals, consisted mainly of hastily-fortified villages and other makeshift defences. But the position had considerable depth, and some effort had been expended in making the villages pivots which, properly held, might have resisted tank assault. The Maginot Line, still unattacked in front, protected the position from a rear attack. The French hoped to hold the line until their reserve armies had been reorganized and equipped and a new British force landed in France.

But the Germans had already secured bridgeheads across the Somme at Abbeville and Amiens, and on June 7 the main German assault was made from Abbeville, where the British 51st (Highland) div. and the incomplete 1st armoured div. formed part of the French 10th army holding the line of the Somme. The 51st div. fell back towards Rouen, but, cut off from that city by the German advance, retired to St. Valéry-en-Caux, where it was surrounded by superior German forces and forced to capitulate on June 12.



Battle of France. Map illustrating the withdrawal of French and British troops before the rapidly advancing German army in northern France between June 4 and June 18, 1940

Further attacks developed in the next few days, chiefly on the Aisne, where the French offered gallant resistance. But the Germans were able to throw in fresh armour, and penetrated deep into and through the Weygand line. The German Panzers carried out their policy of by-passing strong centres of resistance, leaving them to be reduced by the infantry and artillery.

French resistance was well organized at first, and the withdrawals so coordinated that some semblance of a continuous front was maintained. But with the breakdown of communications, whole divisions were compelled to fight and retreat without orders or plan. Italy declared war on the Allies on June 10, and the French, realizing they could not hold the line any longer, fell back on the Seine. By June 12 the Germans had reached and crossed the Seine between Paris and Rouen and captured Reims, while in the centre German troops were within 12 m. of Paris.

East of the Aisne, the French—outnumbered, outgunned, and outmanoeuvred—fell back on the Marne, hoping to establish yet another defence line there. But the pursuing enemy gave no pause and, crossing the Marne from

Château-Thierry eastwards, occupied Châlons. On June 13 Paris was declared an open town. The following day the Germans entered it, the French government having moved to Tours some days earlier.

After the fall of Paris, the main German drive developed S.E. between Paris and the Maginot Line. Verdun fell on June 15, and a frontal assault penetrated the Maginot Line near Saarbrücken. Although plans were made for a rally on the Loire, nothing came of them. Nor did the landing at Cherbourg of fresh British troops, including a Canadian brigade, have any effect.

On June 7, the British 1st armoured div., which had lost so heavily in vehicles and men during the defence of the Somme that it consisted of only 50 tanks, was ordered by Weygand to hold the line of the river Andelle N.E. of Rouen against an anticipated Panzer attack. Without air or artillery support, the 1st div. was compelled to withdraw across the Seine, where it joined the 52nd (Lowland) div., which had arrived in France on June 9 by way of St. Malo, Brest, and Cherbourg to form part of the covering force for the contemplated withdrawal from the lines of communication.

When the German armies crossed the Seine, the French position became hopeless; to the E. the defences in Champagne had been overrun and the Maginot Line outflanked. With the German drive into central France, whole divisions were cut off in Alsace and Lorraine and the line of retreat of all French forces retiring from the Rhine and Saar was cut.

In the N. sector, British armour and infantry were fighting desperate rearguard actions, and on June 13 Gen. Sir Alan Brooke arrived at Le Mans to take command of all British troops in France which were embodied in a single corps, the 2nd. On the previous night the 157th brigade of the 52nd div. took over a position E. of Conches, which had been exposed by the retreat of the French 10th army. At the same time the armée de Paris was falling back on Orléans, leaving the 52nd division in grave danger of being surrounded.

On June 14 Weygand informed Brooke that the French army was no longer capable of organized resistance; but that, in accordance with a decision of the Allied governments, Brittany was to be defended by a line held across the peninsula in the vicinity of

Rennes. Sir Alan issued instructions for the participation of the British troops in this plan, but on returning to his H.Q. and ringing up the C.I.G.S. found that neither the C.I.G.S. nor the British prime minister had heard of such a plan, and he was ordered to arrange the evacuation of all British troops not actually serving with the French 10th army. The same evening he was told that he was no longer under Weygand's orders, and that the British forces, apart from those with the French 10th army, were to withdraw to England at once. Withdrawal began June 15 through Brest, Cherbourg, St. Malo, St. Nazaire, La Pallice, and Nantes.

The British troops remaining were the 157th brigade of the 52nd Lowland div. and what was left of the 1st armoured div. On June 16 the French 10th army began to retire on the Alençon-Rennes line, but as cooperation with this movement was contrary to the instructions given to the British commander, the British disengaged and fell back on Cherbourg. On June 17 Gen. Brooke was informed from London of the French request for an armistice. In confused fighting the armoured div. was split, one half making for Cherbourg, the other for Brest. From these two ports the remnants embarked June 17-18. When the last troopship left Cherbourg at 4 p.m. on the 18th German guards were within 3 m. of the harbour.

#### Increasing Number of Surrenders

While the armistice negotiations dragged out, the remnants of the French armies continued fighting gallant but hopeless battles. In the W. their forces were withdrawing into Brittany and S. of the Loire; the armies still fighting around Paris halted to give battle on the middle Loire, thence continued their retreat in the hope of gaining more favourable positions; the armies in Champagne (outflanked on both sides by German armour) endeavoured to break through to Dijon; in Lorraine, troops were fighting in squares and progressing slowly S., as was the army of Alsace. By June 20, the Germans had captured Lyons and penetrated the Jura as far as the Swiss frontier. Thereafter city after city fell into German hands, and in increasing number French divs. were surrounded and forced to surrender.

The armistice was signed at 6.50 p.m. on June 22, but hostilities did not cease until 6 hours after the Italian government had notified the German High Com-

mand that a Franco-Italian armistice had also been concluded. Not until June 25 had Mussolini completed his inglorious little campaign on the French-Italian border and signed the armistice. In six weeks the battle of France had resulted in the complete defeat of the French army, considered at the beginning of the war to be the strongest in Europe. *Consult The Six Weeks' War*, T. Draper, 1946.

David Le Roi

**France, ANATOLE (1844-1924).** Pen-name of Jacques Anatole Thibault, French author. Born in



Paris, April 16, 1844, he was the son of a bookseller, whose shop was much frequented by literary men. Educated at the Collège Stanislas, Paris, he published his first book, a study of Alfred de Vigny, in 1868. After producing two volumes of poems in 1873 and 1876, he turned to prose work with the tales, *Jocaste* et le Chat Maigre, 1879.

So far he had been only mildly interested in writing. But then came a long succession of works of fiction, satire, and criticism of which the following are noteworthy: *Le Crime de Sylvestre Bonnard*, 1881; *Le Livre de mon Ami*, 1885; *Balthazar*, 1889; *Thais*, 1890; *La Vie Littéraire*, a series of reprinted essays, 1888-92; *La Rôtisserie de la Reine Pédauque*, 1893; *Les Opinions de M. Jérôme Coignard*, 1893, and *M. Bergeret à Paris*, 1901, two satiric studies of contemporary French affairs; *Pierre Nozière*, 1899; *Crainquebille*, 1902; *Histoire Comique*, 1903; the sceptical but brilliantly written history of *Jeanne d'Arc*, 1908; the satirical survey of modern French history, *L'Île des Pingouins*, 1908; *Les Dieux ont Soif*, a story of the Revolution, 1912; and another great satire, *La Révolte des Anges*, 1914; reminiscences, *Le Petit Pierre*, 1918, and *La Vie en Fleur*, 1922.

Anatole France was a staunch supporter of Zola in the Dreyfus affair, and a prominent supporter of socialist, radical, and anti-militarist causes. He was elected a member of the French Academy in 1896, and was an officer of the Legion of Honour. He visited England in 1913. He strongly supported his country's entry into the First Great War, even offering him-

self as a volunteer in 1914, and strove always to uphold the idealism of the French cause, publishing a striking appeal to this end in 1920. He received the Nobel prize for literature in 1921.

Sceptical, erudite, and keenly interested in actuality, he was perhaps the leading figure of his day in French literature. It is hardly fair to call Anatole France a novelist; rather was he a kindly satirist, using the novel—the *récit*, as he would have styled it—as his medium for dissertation and analysis. A master of the impersonal and almost wholly impartial method which only a few of the greatest French writers have successfully compassed, he took history ancient and modern as his theme; but his delight was in turning ancient or legendary tales inside out and showing that the same characteristics are common to humanity in all ages. In a sense he resembled Bernard Shaw, or even Wells; but he was less ruthless and restless than either, perhaps because he did not indulge either in destruction or in reformation. His work leaves not the somewhat acid taste of exposure or disillusion, but the pleasant conviction that we now know the humorous as well as the conventional side of whatever subject or personality he put before us. He died at Tours, Oct. 13, 1924.

**Bibliography.** Complete works, trans. and ed. F. Chapman and J. L. May, were published by The Bodley Head. Lives include those by L. P. Shanks, 1919; J. L. May, 1924; H. de Noussanne, 1925; H. Stewart, 1929; B. Cerf, 1927; J. J. Brousson, Eng. trans. J. Pollock, 1934; E. P. Dargan, 1937.

**France and Germany Star.** Campaign medal of the Second Great War. The medal was awarded for operational service on land between June 6, 1944 and May 8, 1945, in France, Belgium, Holland, and Germany. The ribbon is striped vertically in red, white, and blue, the colours of the Union flag and of France and the Netherlands. The medal is a six-pointed star, identical with other campaign stars except that it carries its own title on the surrounding band. See illus. Campaign Stars.

**Francesca, PIERO DELLA (c. 1416-92).** Italian painter. He was born at Borgo San Sepolero, where he died. In 1439 he was employed by Domenico Veneziano on the frescoes of Sant' Egidio, Florence. Later he collaborated with Bramantino at the Vatican, and in 1469 entered the service of Duke Federigo at Urbino. The master



of Perugino and Luca Signorelli, he was learned in the laws of perspective and introduced some improvements in oil-colours. From the geometrical structure of his work he has acquired the appellation of the first Cubist.

**Francesca DA RIMINI.** Heroine of a famous Italian love-story. Giovanni Malatesta of Rimini (nicknamed Scianciato, the lame) obtained her in marriage from her father, Guido da Polenta, lord of Ravenna, and sent his brother Paolo to fetch her. Francesca and Paolo fell in love and were caught together and slain by Giovanni, 1285. The story was told by Dante in the *Inferno*; it has also been used by Leigh Hunt, 1816, Silvio Pellico, 1818, Stephen Phillips, 1899, and D'Annunzio, 1901. Ingres, 1819, Cabanel, 1870, and G. F. Watts, 1879, have shown the story in paintings; and several operas and a ballet have been founded on it. See Dante; Rimini.

**Franchet Comté.** District of Europe; in full, the free county of Burgundy. It was originally an independent state, then part of the duchy of Burgundy, and finally part of France. Its early capital was Dôle, but after 1678 Besançon; it lay between Lorraine and Switzerland, while through it ran the Saône. After the dissolution of the Frankish Empire the free county was one of the many little states which arose on its ruins. It had its own counts, who retained a practical independence, in spite of occasional interference from the kings of France and Germany, until the 14th century, when it was included in the duchy of Burgundy.

In 1477, on the death of Charles the Bold of Burgundy, it was seized by Louis XI of France, but a few years later it was regained by the emperor Maximilian, the son-in-law of Charles. From Maximilian it passed to Charles V and Philip II of Spain, and then in 1668 it was conquered by Louis XIV of France, who formally secured it by the treaty of Nijmegen in 1678. The last remains of its independence were then extinguished, and since then it has been part of France. Since the Revolution it has been divided, and now forms the depts. of Haute Saône, Jura, and Doubs, and part of Ain. See Burgundy.

**Franchet d'Esperey, Louis** (1856-1942). French soldier. He was born May 25, 1856, at Mostaganem, Algeria, and entered the army in 1876. He took part in the Tunis operations, 1881-82, in the Tongking expedition, 1885-87, and

served in China, 1900-01, and in Morocco as general of division in 1913. He was placed at the head of the French 5th army in Sept. 1914, and in 1916 was given command of the eastern group of armies in France. In 1918 he was appointed to command the Allied armies at Salonica. A uniformly successful general and a typical fighting soldier, he completely defeated the German-Bulgarian forces, drove the Germans and Hungarians out of Serbia, and quelled the resistance of the Hungarians. He was awarded the baton of a marshal in 1921, and died July 8, 1942.

**Franchise** (late Lat. *francus*, free). Originally something to which the idea of freedom was attached, i.e. the free grant of a privilege. It is now used in two narrower senses, one in law and the other in politics. In law, a franchise is a privilege granted by the crown to an individual, or more usually to a corporation, such as the right to hold a market or fair, or rights of fishing. This use of the term persists in the U.S.A., where franchises are public rights handed over to private or semi-private bodies. In politics, the franchise is the right to vote, especially at elections of members of parliament.

In England the franchise was at first the privilege of all freeholders, who voted in the county court; but by an Act of 1430 it was restricted, as far as the counties were concerned, to those whose freeholds were worth 40s. or more. In the towns the franchise varied, each borough having its own custom, usually conveyed to it by royal charter. There were variations, too, in the franchise in Scotland and Ireland. Uniformity was first introduced by the Reform Act of 1832. In England, in the counties, it was given to the existing freeholders, and in addition to copyholders and those renting land worth £50 a year. The total electorate numbered about 1,000,000. In the boroughs a uniform franchise was introduced, the vote being given to all householders whose premises were worth £10 a year and upwards. In 1867 a second Reform Act reduced the qualifications in the counties to the holders of land worth £12 a year, and in the boroughs gave it to all householders. In addition a lodger franchise was introduced. For Scotland and Ireland there were also Reform Acts, the main principles being the same as in England.

In 1884 a Reform Act introduced uniformity, not only in county and

borough, but in England, Scotland, and Ireland. All householders were given the franchise, as were lodgers in counties as in boroughs. Certain classes were disqualified as before, e.g. aliens and criminals, and women were still excluded. In addition there was still a university franchise, based on the possession of a degree.

The fourth considerable extension of the franchise took place by an act of Feb. 1918 when women who had attained the age of 30 were allowed the right to vote. (Women ratepayers of 21 had received the municipal franchise in 1869.) "Universal" adult suffrage was introduced in 1928. Each new Reform Act added millions to the electorate, which by 1945 had grown to 33,679,041. In that year the parliamentary and the municipal franchise were placed on the same basis and a person of 21 of either sex, not subject to any legal disability, and qualified by 3 months' residence, occupation of business premises of at least £10 a year in value, or marriage to a person having the business premises qualification, became entitled to be entered on the electoral register. An Act of 1948 abolished all plural voting including the university franchise and the business premises vote. See Election; Reform Acts; Vote.

**Francia, FRANCESCO** (c. 1450-1517). An Italian painter. He was born at Bologna, his real name



Francia. Madonna, Infant Jesus, and St. John, an example of the artist's work in the Dresden Gallery

being Francesco Raibolini, and was apprenticed to a goldsmith. He achieved distinction as a worker in metal, in niello, and in type-founding—he devised the first italic type—but shortly after the coming of Lorenzo Costa to Bologna, 1483, he became a painter. Costa and



Francis were associated in an altarpiece for the Church of the Misericordia, Bologna, Francis's earliest dated work. Though at first he followed Costa's style he quickly surpassed that master in power of conception and colour. The Madonna and Saints, with S. Anne enthroned, in the National Gallery, London, is one of his masterpieces, but he is best studied at Bologna.

His famous Baptism of Christ is at Dresden. Among his portraits are those of Bartolommeo Bianchini (Salting collection), The Marchese Bovio (Lichtenstein Gallery, Vienna), Prince Federigo Gonzaga (Leatham collection). In fresco two episodes from the life of S. Cecilia survive in the chapel of that saint at Bologna. Francis died at Bologna, Jan. 6, 1517. *Consult* Life. G. C. Williamson 1901

**Francis, José Gaspar Rodríguez** (1757-1840). Dictator of Paraguay. Born at Asunción, of Portuguese origin, and educated at the university of Córdoba de Tucumán, he first studied theology, but after taking his degree practised law. In 1811 Paraguay declared itself independent of Spain, and Francis, the ablest of its revolu-

tionary leaders, became secretary of the national junta, joint dictator, 1813, joint dictator for three years, 1814, and sole dictator for life, 1816. In 1816 he dissolved congress, and for the rest of his life ruled tyrannically but beneficially. His vigorous opposition to intercourse with other countries resulted in the development of Paraguay's resources. He died Sept. 20, 1840.

**Franciade.** Name given to each period of four years in the new calendar set up by the authors of the French Revolution in 1793. The idea and form of the word were derived from the Greek Olympiad. *See* Calendar.

**Francis.** Christian name, used by both males and females. It is derived from the word frank, free, and was first used in France in the form François. It passed over to England about the time of Henry VIII, in the form of Francis. In the 18th century the form Frances began to be used for girls. Frank is a variant. The German equivalent is Franz, a popular name in Germany; the Italian is Francesco, the Spanish Francisco. Francesca is the Italian feminine, and Franziska the German.

## FRANCIS: THE SAINT OF ASSISI

G. G. Coulton, Author of *From St. Francis to Dante*

*The life and work of this saint is a necessary introduction to the articles on Monasticism; Franciscans; and on the other religious orders*

Francis of Assisi was born in or about the year 1182. His father, Pietro di Bernardone, was a cloth merchant, and belonged to the commercial aristocracy of Assisi. Pietro was travelling in France when the son was born to whom on his return he gave the then unusual name of Francesco. The saint's youth was marked by a love of pleasure, society, and song; all his life he retained a strong affection for the French language—then the literary language of Europe—though he could never speak it well. As he grew up he began to repent of his irregularities, which had always been those of a generous and refined nature.

In 1202 Francis was taken prisoner in battle against the Perugians, and remained in captivity for a year, during which he was noted for his gaiety and his forbearance towards his fellow-prisoners. Returning to his former dissipations, he fell seriously ill, and, in a moment of convalescence, gazing out upon the landscape beneath the walls of Assisi, he found that "neither the beauty of the fields, the pleasantness of the vineyards, nor anything that is fair to see could in any wise delight him. . . . And from that day he began to despise himself, and in some

sort to hold in contempt what he had admired and loved before; yet not altogether, for he had not yet been loosed from the bonds of vanity." He dreamed of military fame, and had actually started on an expedition to Apulia when a vision recalled him. His gaiety now became more fitful; he was penetrated with a deeper pity for the poor, and especially for lepers; the self-conquest which first enabled him to kiss a leper marked a fresh step in his spiritual life.

### A Religious Knight-errant

Francis now spent much time in solitary prayer, and at one of these moments, in the little half-ruined church of S. Damiano, the crucifix seemed to speak to him with an articulate voice: "Francis, go repair My House, which as thou seest is wholly falling into ruin." Taking these words too literally, he sought to assist the reparation of S. Damiano by selling one of his father's horses with a load of valuable cloth. The result was a complete rupture between him and his father, and the saint went forth naked into the world. "Henceforth I may say freely 'Our Father which art in heaven,' and no longer 'father Pietro di Bernardone.'"

This was in 1207. Francis then

began a life of religious vagabondage—or rather, knight-errantry. We find him repairing S. Damiano with his own hands, tending the lepers and living among them, preaching in the streets and public squares, and often treated as a madman. At last, apparently on Feb. 24, 1209, the gospel for the day suggested a more definite rule of life (Matt. x, 7-10). Thenceforward he took as his ideal the literal imitation of Christ, and became perhaps the most Christ-like of all the figures in Church history.

### Foundation of His Order

At the end of 1209, or more probably in 1210, having already a small group of disciples, he went to Rome and begged Innocent III to confirm a brief rule which he had drawn up, and thus to authorise a new religious order. The monks were individually poor, but held corporate endowments. The friar was to be moneyless, not only individually but also in the mass; he was to live by the labour of his hands if possible, and, where that failed, by begging. The pope, after some natural hesitation, consented. The new order multiplied rapidly, thanks to the personal influence of Francis and to the crying need of the times.

Many reformers, in the latter half of the 12th century, had aimed at a return to apostolic life; but, sooner or later, all of these came into conflict with the Church. S. Francis combined the most extraordinary religious zeal and charity with a spirit of complete devotion to the hierarchy, and was thus able to renew religious life in Europe without breaking with the Church. There can be little doubt that he and his followers postponed the religious revolution of the 16th century by several generations. Yet this reconciliation was not effected without considerable sacrifices of ideal.

### Suffering and Self-Sacrifice

As time went on S. Francis rose to even greater heights of suffering and self-sacrifice, but he lacked the more ordinary qualities required in the general of a religious order. Here his zeal for conversions actually stood in his way. Apart from his frequent missionary journeys in Italy, he planned others abroad. In 1212 he started for Palestine, but was driven by storms to the N.E. coast of the Adriatic. In 1214 he went to preach in Spain; in 1217 he was with difficulty restrained from a similar journey to France. In 1219 he at last found his way to Syria and Palestine, and was away more than a year.

During his absence in Palestine, his vicars joined with other notables in a policy which tended to bring the Franciscans into line with the older orders. At this news he suddenly returned (summer of 1220), but was unable entirely to check the movement, which had considerable support from the papal court. Recognizing his own want of strictly business qualities, he resigned the direction of the Order to Pietro dei Cattani as vicar-general, and from this time forward could only protest against the formalism which was creeping steadily into his Order. The rest of his life was spent in missionary journeys about Italy, and in remote hermitages where he gave himself up increasingly to the contemplation of Christ's passion. At one of these (La Vernia, Sept., 1224) he is said to have miraculously received the Stigmata, or five wounds of Christ. He died Oct. 3, 1226. He was canonised in 1228 and his festival is kept on Oct. 4. See Assisi.

**Bibliography.** The Mirror of Perfection, ascribed to Leo of Assisi, Eng. trans. S. Evans, 1898; The Little Flowers of St. Francis, Eng. trans. T. W. Arnold, 1908; Lives, Thomas of Celano, Eng. trans. A. G. F. Howell, 1908; G. K. Chesterton, 1923; A. Bonnard, 1930; Father Cuthbert, new ed. 1933; P. Sabatier, new ed. 1942; R. C. Petry, 1942.

**Francis of Paola** (c. 1416-1507). Saint and founder of the Order of Friars Minims. Born at Paolo, of poor parents, when 15 years old he became a hermit. Being soon joined by others, he founded an order in 1436. Their first monastery was built in 1454, and the new order was authorised by Pope Sixtus IV in 1474. Other monasteries were founded in Italy, Sicily, France, and Germany, before Francis's death at Plessis-les-Tours, April 2, 1507.

**Francis de Sales** (1567-1622). Saint and writer. Of noble family, he was born near Annecy, Savoy, Aug. 21, 1567, and educated at Paris and Padua. He was a great champion of the Roman Catholic faith, had several friendly but fruitless discussions with



Francis de Sales,  
French saint

Beza, and won many Protestants to his own church, especially by his preaching in the Calvinist province of Chablais, 1594-98, and in Paris, 1602. In Sept., 1602, he became bishop of Geneva. In 1610 he founded the order of Nuns of the



S. Francis of Assisi, when dying, carried upon a litter to bless the town of Assisi. From a painting by L. Benonville

Visitation. He was a man of saintly life. His Introduction to the Devout Life, 1609, is translated into many languages, and highly esteemed by Christian people generally. He died at Lyons, Dec. 28, 1622, was canonised in 1665, and adopted as the patron saint of writers and journalists in 1923. His festival is kept on Jan. 29. His Works were edited by H. B. Mackay, 1892. There are Lives by H. L. Lear, 1871; M. M. M. Scott, 1913; H. Burton, 1926; H. Bordeaux, 1929; M. Muller, 1936.

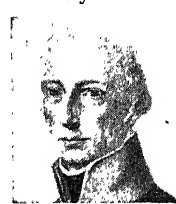
**Francis I** (1708-65). German king and Roman emperor. The son of Leopold, duke of Lorraine, and through his mother, a grandson of Philip, duke of Orleans, he was born Dec. 8, 1708. Related to the Hapsburgs, he was educated in the court circle at Vienna,



Francis I,  
German king

and a marriage was arranged for him with the future archduchess, Maria Theresa. In 1729 he became duke of Lorraine, but in 1735 he exchanged that duchy for Tuscany, of which he became grand duke when the last Medici ruler died in 1737, having in the meantime (1736) been married to Maria Theresa. In 1740 his father-in-law, the emperor Charles VI, died, and the war of the Austrian succession began. In the struggle against Frederick the Great, Maria, not her husband, was the dominant figure, and her efforts resulted in 1745 in the election of Francis as emperor. He died at Innsbruck, Aug. 18, 1765, having been merely the assistant of his wife. From the pair the existing Hapsburgs are descended, hence the family is known as Hapsburg-Lorraine. See Maria Theresa.

**Francis II** (1768-1835). Emperor of Austria and last ruler of the Holy Roman Empire. Born in



Francis II,  
Emperor of Austria

Florence, Feb. 12, 1768, he was educated there and in Vienna. His father, hitherto grand duke of Tuscany, became Roman emperor as Leopold II in 1790, and two years later (March 1, 1792) Francis succeeded him. A little earlier the French Revolution had begun. Francis's aunt was Marie Antoinette, and on both public and private grounds he was soon committed to the war against France. One disaster followed another. He was forced to make the treaty of Campo Formio, and later that of Pressburg. The Netherlands were in revolt; Russia and Turkey were willing to take advantage of his difficulties. The states of Germany lost their last vestiges of unity, and in 1804 Francis took the title of emperor of Austria, thus seeking to unite more closely the various lands, Hungary and Bohemia among them, over which he really ruled. In 1806 the Holy Roman Empire, of which he was the nominal head, ceased to exist.

Although he had Metternich for his minister, Francis took a leading part in controlling the policy of Austria, both domestic and foreign. He came to terms with Napoleon, giving him his daughter in marriage; but in 1813 he joined the Allies, and his armies assisted in Napoleon's defeat. He died March 2, 1835. He was four times married, and left his successor, Ferdinand I, and other children, one being the father of the emperor Francis Joseph. See Europe: History; Vienna, Congress of.

**Francis I** (1494–1547). King of France. Son of Charles of Valois, he was born at Cognac, Sept. 12,



Francis I,  
King of France

1494, and in 1515 succeeded his cousin Louis XII, whose daughter he had married in 1512. He invaded Italy and defeated the duke of Milan at Marignano in 1515. In 1519 he made an unsuccessful bid for the imperial crown, which Charles V obtained, and the famous rivalry of the two monarchs began. Francis's attempted alliance with Henry VIII of England, at the Field of the Cloth of Gold, 1520, came to nothing, but he again invaded Italy, 1525, and was captured at Pavia, Feb. 24. Kept prisoner at Madrid, he was set free in 1526 on surrendering Burgundy and abandoning various claims in favour of Charles. Once free, however, he renewed hostilities, and won certain modifications from Charles in 1529, whose sister Margaret he married, 1530.

The struggle was resumed in 1536, Francis making useful alliances with the German Protestant princes, and with the sultan Solymán I (1542), but had reached no definite conclusion on his death at Rambouillet, March 31, 1547. Despite the jealousies and vacillations of his foreign policy, Francis greatly strengthened the royal power. He secured for himself the nomination of bishops, reduced the judiciary powers of the nobility, strengthened provincial administration, reformed the national exchequer, and reconstituted the permanent army. A patron of many notable artists and writers of the Renaissance, including Benvenuto Cellini and Francesco Primaticcio, he founded the Collège de France, 1530. *Consult* Lives by J. D'Orliac, 1933; F. Hackett, 1934.

**Francis II** (1544–60). King of France. Born at Fontainebleau, Jan. 19, 1544, he was the eldest son of Henry II. He was married to Mary Stuart, Queen of Scots, 1558, and became king on his father's death in a tournament, July 10, 1559. His reign only



Francis II,  
King of France

lasted for a year and a half, and during that time the government was conducted by his mother, Catherine de' Medici, and his kinsmen, the Guises. He died suddenly in Paris, Dec. 5, 1560.

**Francis I** (1777–1830). King of the Two Sicilies. Son of Ferdinand I, he was born in Naples, Aug. 19, 1777. In 1812 his father made him regent of Sicily and in 1820 regent of Naples. He came to the throne in 1824 and placed himself under the tutelage of Austria, inaugurating an era of oppression and corruption which reduced his subjects to despair. An insurrection in 1828 was put down with unexampled cruelty, the commune of Bosco being razed to the ground. His alarm at the French revolution of 1830, and the fear of the vengeance of his own people, caused his death, Nov. 8, 1830.

**Francis II** (1836–94). King of the Two Sicilies. Son of Ferdinand II (Bomba), he was born Jan. 16, 1836, and ascended the throne in 1859. Characterless and weak, he rejected all proposals of reform until Garibaldi's invasion of Sicily, 1860, when his tardy offer of a constitution was rejected by his people. He fled to Capua and thence to Gaeta, which, after a brief siege, surrendered, Feb. 12, 1861. The kingdom was incorporated with Italy and Francis took refuge in Rome. After 1870, Francis lived in Germany and Austria. He died Dec. 27, 1894.

**Francis I** (1853–1938). Prince of Liechtenstein. He was born Aug. 28, 1853, and succeeded his brother John II in 1929, the eleventh of his dynasty to rule over the principality. Francis continued the benevolent traditions of his predecessor. When the annexation of Austria to Germany brought the National-Socialist regime to his borders, without actually abdicating he entrusted his reigning powers to his great-nephew, Francis Joseph, March 31, 1938. He died at Feldsberg, Moravia, July 16, 1938.

**Francis, JOHN** (1811–82). Publisher. Born in Bermondsey, July 18, 1811, and apprenticed to a London newspaper agent, he entered The Athenaeum office as a clerk, 1831, and became business manager and publisher of that paper 1832. He retained this post for nearly 50 years, also supervising the commercial side of Notes and Queries from 1872. He took an active part in the campaign for the repeal of the advertisement, stamp, and paper duties, 1853–61. He died April 6, 1882.

**Francis, KAY** (b. 1899). Professional name of Katherine Edwina Gibbs, American actress. She was born in Oklahoma City, Jan. 13, 1899, and educated at convents at Roxbury and New York. Making her entrance on the professional stage in 1925 as the Player Queen in Hamlet, she entered films in 1930. She appeared in many Warner productions, in nine years making over 50 pictures. These included Cynara; Trouble in Paradise; Wonder Bar; I Found Stella Parish; The White Angel. In 1946 she appeared in Woman in the Case.

**Francis, SIR PHILIP** (1740–1818). British civil servant and supposed author of *The Letters of Junius* (q.v.).



Francis  
After J. Lonsdale

The only son of Philip Francis (c. 1708–73), translator of Horace, he was born in Dublin, Oct. 22, 1740. Educated at St. Paul's School, London, he filled several minor government appointments and was first clerk at the war office, 1762–72.

A member of the council of Bengal, 1774–81, he quarrelled with Warren Hastings, who wounded him in a pistol duel, 1779. He paid 50,000 rupees as defendant in a marital action brought by G. F. Grand, an officer in the East India Company's service, whose young wife, after living for a time under the protection of Francis, became in 1801 the wife of Talleyrand, and returned to England with a large fortune. Francis was M.P. for Yarmouth, I.O.W., 1784; Bletchingley, 1790; and Appleby, 1802; assisted Burke in impeaching Hastings; incurred the enmity of Pitt; became an intimate of the prince regent; and supported Wilberforce against the slave trade. In 1793 he founded the Society of Friends of the People; in 1806 received a knighthood; in 1814 married Emma Watkins, whom he encouraged in her belief that he was the author of the *Junius Letters*. He died in London, Dec. 22, 1818. *Consult* Memoirs, J. Parkes and H. Merivale, 1867.

**Francis Ferdinand** (1863–1914). Austrian archduke. Son of the archduke Charles Louis and nephew of the emperor Francis Joseph, he was born at Graz,

Dec. 18, 1863. After inheriting, in 1875, the wealth and titles of the house of Hapsburg-Este, formerly dukes of Modena, he became, by the death of the crown prince Rudolf in 1889, heir-apparent to the crown of Austria-Hungary.



Francis Ferdinand, Austrian archduke

On his morganatic marriage in 1900 to the Countess Sophia Chotek, who was created Princess Hohenberg, he renounced for the children the right of succession, but his own position remained, and for the next fourteen years he was one of the directors of the policy of Austria-Hungary. He was making a tour in Bosnia when he was assassinated by a Serbian named Prinzip, at Serajevo, June 28, 1914, a crime that served to precipitate the First Great War.

**Francis Joseph** (1830-1916). Emperor of Austria. The eldest son of the archduke Francis and a grandson of the emperor Francis II, he was born at Vienna, Aug. 18, 1830. He was educated carefully but narrowly, like all the Hapsburgs. In 1848 the shaking throne was occupied by Ferdinand, a childless imbecile. The hopes of the Hapsburgs were therefore centred on Francis Joseph, his nephew, and it was decided that he should be placed upon the throne.



Francis Joseph, emperor of Austria  
After L. Horowitz

Francis Joseph reigned from Dec. 2, 1848, until Nov. 21, 1916, one of the longest reigns in the world's history. But its interest is not so much in its length as in its vicissitudes. He saw Austria lose her possessions in Italy, 1859, and, defeated by Prussia, 1866, driven from the German confederation. A hated rule disrupted Hungary and Bohemia. The acquisition of Bosnia and Herzegovina, 1908, hardly compensated for endless difficulties with the Balkan states, for the growing suspicions of Russia, or for disorder in the national finances, while Austria's adherence to the Triple Alliance made her more than ever subordinate to Prussia.

His private life was even more tragic. His wife Elizabeth.

daughter of Maximilian Joseph, king of Bavaria, was assassinated at Geneva in 1898; his only son, Rudolf, committed suicide, or was killed, in 1889; his nephew and heir, the archduke Francis Ferdinand, was murdered at Serajevo, June 28, 1914, with the most momentous consequences.

The emperor took a real part in ruling his empire with its warring peoples and inherited difficulties, and but for him it is probable that it would have fallen to pieces before it did. He was diligent and up to a point capable, but he could hardly be expected to understand, still less to sympathise with, the liberal movement that shook Europe during his youth. He had his earliest troubles with Hungary; it was not until 1867 that he was there recognized as king. His life story is that of Austria-Hungary, and to a large extent that of Europe, including Germany, which before the war of 1866 he tried hard to unite under his own overlordship. He died Nov. 21, 1916, and was succeeded by his grand-nephew, the archduke Charles, who abdicated Nov., 1918.

**Francis Joseph** (b. 1906). Prince of Liechtenstein. He was born Aug. 16, 1906, and succeeded on the death of his great-uncle Francis I, July 16, 1938, though he had been acting as regent since March 31 that year. An enlightened ruler, he preserved the independence of the principality through the Second Great War.

**Franciscans.** Order of friars, also known as Friars Minor or Minorites, or Grey Friars, founded in 1209 by S. Francis of Assisi (*q.v.*). The first general chapter, in 1219, was attended by upwards of 5,000 members. The rule was solemnly ratified by Honorius III in 1223.

A year later the order was established in England, at Canterbury. Following a relaxation of the strict rule of poverty, the order was divided into Conventuals, who lived in large convents under modified conditions; and Observantines, who adhered to the original rule. Called



Franciscan. Dress of the order

in France Cordeliers, the Observantines subsequently divided into Observants, Reformed, Discalced, Recollects, and Capuchins.

In 1897, as a result of the efforts of Leo XIII, while the Conventuals and Capuchins remained distinct, the other branches of the order were united under the name of Ordo Fratrum Minorum (order of brothers minor). The dress of the order was a coarse grey cloth habit, with pointed hood, under-tunic, drawers, and waistcord. Five popes and more than 50 cardinals have belonged to the order, which numbered among its members Cardinal Ximenes, S. Bonaventure, Duns Scotus, Alexander of Hales, Roger Bacon, and William of Ockham. Allied to it, as a second order, were the Poor Clares, and, as a third order, the Tertiaries. At the dissolution there were 64 houses in England.

**Francistown.** Town of the Bechuanaland Protectorate, S. Africa. It stands near the Shashi river, 50 m. N.W. of Tati.

**Francis Xavier.** This French saint is entered at Xavier, Francis.

**Francium.** Radio-active element, symbol Fr, at. no. 87, formerly called virginium in America. One isotope, mass no. 224, is in the thorium series; another, mass no. 223 (actinium K) is in the actinium series. Both have a half-life of 21 minutes.

**Franck, CÉSAR AUGUSTE** (1822-1890). Belgian-born French composer. Born at Liège, Dec. 10, 1822, he was intended by his father for a musical career, and after studying at Liège conservatoire he went to Paris with his family to find wider scope.



César Franck, French composer

His progress at the Paris conservatoire, which he entered in 1837, was rapid and brilliant, but his unconventionality shocked the examiners. This official disapproval of his style as composer and performer (he was one of the finest organists of his age) was to last throughout his life. Owing to a quarrel with his father, he became a teacher, and was appointed organist at S. Clothilde in 1858. In 1872 he became organ professor at the conservatoire. Naturalised in France in 1873, he received the Legion of Honour for teaching work. He died Nov. 8, 1890. Consult C.F. N. Delmuth. 1949.

Franck's fame was established within 14 years of his death. Many works were neglected, but his symphonic variations for piano-forte and orchestra became one of the most popular pieces in the concert repertory. His symphony; sonata for violin and piano-forte; the poem-symphony, *Redemption*; and choral work, *Les Béatitudes*, have been repeatedly performed, and influenced many of the younger French musicians. His quartet, 1889, is considered his masterpiece. *Consult César Franck*, V. d'Indy. Eng. trans. R. Newmarch, 1910; *Sparks Among the Stubble*, C. Maud, 1924.

**Franck, JAMES** (b. 1882). German-born U.S. physicist. Born at Hamburg, Aug. 26, 1882, he studied at Heidelberg, and in 1915 was appointed associate professor of physics at Berlin University, in 1920 professor at Göttingen. His researches (with Gustav Hertz) in ionisation of gas molecules brought about a new method of investigation of the structure of atoms. He shared with Hertz the Nobel prize for physics in 1925. Of Jewish extraction, Franck left Germany on the advent to power of the Nazis, and taught for a time at Copenhagen. In 1935 he went to the U.S.A., where he held an appointment at Johns Hopkins University, Baltimore, 1935-39, and was Hitchcock professor at the University of California, 1941-47.

**Franck, SEBASTIAN** (c. 1499-1542). German writer. Born at Donauwörth, he was trained for the priesthood at Ingolstadt and Heidelberg. He had already taken orders when, about 1525, he became a Protestant. He was banished from Strasbourg on account of his opinions in 1531, and settled at Ulm; but the publication of his *Gulding Arch*, 1538, led to his expulsion therefrom in 1539. He went to Basel, where he died. His collection of German Proverbs, 1541, enjoyed a long popularity.

**Francke, AUGUST HERMANN** (1663-1727). German educationist. Born at Lübeck, March 23, 1663, he was trained at Erfurt and Kiel, and studied Hebrew at Hamburg. Settling at Leipzig, he established a kind of literary club, under the name of *Collegium Philobiblicum*. He taught Greek and Oriental languages at Halle, where he established a paedagogium and orphans' house (1698), the success of which attracted much attention among philanthropists in England. Francke became famous through his lectures on the Bible.

**Franckenstein, SIR GEORGE** (1878-1953). Austrian diplomat who became a British subject. The son of Baron Karl Franckenstein, Austrian diplomat, he was educated in Vienna and entered the Austro-Hungarian diplomatic service. After serving in Washington, St. Petersburg, Rome, and Tokyo, he came to London in 1920 as Austrian envoy extraordinary and minister plenipotentiary. In 1922 he headed the commission which negotiated a League of Nations loan for reconstruction in Austria. A bitter opponent of National Socialism, he resigned his post in London after Germany annexed Austria, 1938. That year he was naturalised as a British subject and knighted. In 1939 he published *Facts and Features of My Life*. He and his wife were killed, Oct. 14, 1953, in an air accident near Frankfurt-on-Main.

**Franco BAHAMONDE, FRANCISCO** (b. 1892). Spanish dictator, known as General Franco.



Gen. Francisco Franco, Spanish dictator

He was born in Galicia, Dec. 4, 1892, and entered the army. He saw service in Spanish Morocco, was promoted colonel in 1926, and served under the republic of 1931 in the Balearic Is., later being transferred again to Morocco. In 1935 he was appointed chief of staff. Franco organized in July, 1936, the military uprising against the Azaña government of the Left that led to civil war. He assumed the leadership of the insurgents on the death of Gen. Sanjurjo and proclaimed himself leader of the state (caudillo) and commander-in-chief on Oct. 1. His party adopted the title of Nationalists, while the supporters of the government were known as Republicans. On April 19, 1937, various political groups were united by Franco into one single party, which included the Falangists created in 1933. A government headed by Franco, with dictatorial powers, was proclaimed Feb. 1, 1938.

The civil war was waged with terrible bitterness by both sides. (See Spanish Civil War.) When it terminated in 1939, Franco entered upon a policy of repression, making little effort to reconcile the vanquished section of the people. In May he joined the Anti-Comintern Pact; but negotiations

for an alliance with Germany and Italy made no progress. In Aug. came his second government which named him president and prime minister. The grand council of the Falange replaced the Cortes, and the reconstruction of the devastated regions was begun. The conclusion of the Russo-German pact on Aug. 23 shocked Franco, and Spain issued a declaration of strictest neutrality at the outbreak of the Second Great War; but after the capitulation of France, June, 1940, he announced Spain's imperative claim to the possession of Gibraltar. On Oct. 23 he met Hitler on the French border, the latter being anxious for Spanish cooperation in his "new order." The German high command prepared a plan for an assault on Gibraltar by a German-Spanish army.

Franco conferred with Mussolini at Bordighera on Feb. 12, 1941, and next day met Marshal Pétain and Admiral Darlan at Montpellier. When addressing the national council of the Falange on July 17 he made a strongly pro-German speech. But a disrupted economy, social cleavages, and dependence upon anti-Axis powers for needed supplies precluded participation in the war. On the entry of the U.S.A., Spain took over German and Italian diplomatic relations with Spanish-American countries united with the Allied cause, and intensified a campaign for the revival of Spain's influence in her former American empire.

On July 1, 1942, Franco announced the reconstitution of the Cortes, and in Sept. removed his pro-Axis foreign minister and replaced him by a monarchist. The Allied successes in N. Africa modifying his attitude, in May, 1943, he suggested the war should be brought to a close as a deadlock. As the military position of the Allies improved, Franco was faced with a demand that Spain assume a real neutrality, and orders were issued for the withdrawal of a Spanish division supporting the Germans in Russia.

Various acts still caused the Allied governments to question Spain's intentions, and an embargo was laid on shipments of petroleum. The ban was lifted in May, 1944, after Franco had agreed to cut by 90 p.c. the wolfram exported to Germany. On the liberation of France and other German reverses, he stated that his regime had nothing in common with National Socialism, but his bid for an invitation to

The positions of the opposing forces on Aug. 4 were as follows: The French were strung out along the frontier in Alsace-Lorraine, from Strasbourg in the S. to Saarbrücken in the N.; perhaps 150,000 E. of Metz; but the mobilisation was so incomplete and so confused that not even the high command knew where battalions were, or the precise number of troops in any division. Strasbourg



and Metz were important fortresses, which should have been well supplied for a siege.

The crown prince's army was S. of Landau, assembled for the march which carried it over the frontier. The second army was marching through the Haardt Wald by Kaiserslautern. The first army, held back by von Moltke, was cantoned between Neunkirchen, Tholey, and Lebach, making altogether a total of some 450,000 men.

On Aug. 6 came the first real clash of arms. To the S. the crown prince's army, which had driven in MacMahon's outposts from Wissembourg on Aug. 4, defeated him severely on this day at Wörth, and drove his force headlong from the field. On the same day there was an important battle near Spicheren, where the advanced guards of the first and second armies forced back Frossard. So severe were these blows that nothing remained for Napoleon but to form "the army of the Rhine" round Metz, under Bazaine, while MacMahon gathered together fragments into another army at Châlons; thus abandoning the whole of Alsace-Lorraine, except the fortresses, to the enemy.

#### Disaster of Sedan

The Germans, not entirely untouched by the two battles, for the French soldiers had fought well, and confronted by the new situation, paused for a moment before they pressed forward in overwhelming strength. By Aug. 14 the German advanced guards interrupted a commencing retreat of Bazaine's troops from the E. of Metz, and brought about the battle of Colombey-Nouilly, which seriously interfered with French plans. Two days later the second army, which had crossed the Meuse S. of Metz, again interfered with the proposed retreat on Verdun, by the battle of Vionville-Mars-la-Tour, and compelled Bazaine, on Aug. 18, to fight the battle of Gravelotte. Unsuccessful in this, he was driven inside the Metz fortifications.

With these reverses the second empire was tottering to its fall. The moral of the French troops was infected by the cry of "We are betrayed," and this feeling had its reflection, or its origin, in Paris. The emperor was with the army, doing little to save the situation; while the empress Eugénie in Paris was doing her best in a falling cause. MacMahon was now directed to effect the relief of Metz, and commenced the desperate march N. and E. which ended at Sedan.

The Germans, well informed of French movements, had left a sufficient investing force to hold Bazaine, and so liberated a formidable

army to deal with MacMahon. Caught up at Beaumont on Aug. 28, and forced back on Sedan with the Belgian frontier behind him, MacMahon fought a desperate losing action on Aug. 31 and Sept. 1. MacMahon was wounded, and on Sept. 2 de Wimpffen signed the surrender of the last imperial army in the field. Napoleon was present and became a prisoner of war. On Aug. 31 Bazaine made a desperate attempt to break out of Metz, but was driven back under the guns of the place, where he remained until the surrender of his whole army on Oct. 27. Strasbourg, after a ferocious bombardment, had undergone a regular siege. Its commander, General Urich, held out until the inhabitants were in a state of starvation and his defences were pierced. He surrendered to General Werder on Sept. 27.

On Sunday, Sept. 4, the empress fled from the Tuileries, and thereupon a republic was proclaimed, with General Trochu as president and governor of Paris, with full military powers for national defence; Jules Favre became minister of foreign affairs and Gambetta minister of the interior. Energetic measures were taken for the defence of the capital and for the formation of a national army, but there were enormous difficulties to contend with. The German forces were moving forward practically unresisted to invest Paris, and probably at this time an opportunity was lost which would have saved both nations a vast amount of suffering and expense. On Sept. 19 negotiations for an armistice were almost concluded by Bismarck and Jules Favre, but the chancellor demanded the surrender of Strasbourg, Toul, and Verdun; and these conditions the provisional government would not accept.

#### The Siege of Paris

The French position was practically hopeless. On Sept. 20 Paris was closed in. In the fortnight possible for preparation, Trochu had swept into the place all available food, guns, and troops; raised volunteer corps from the inhabitants; and had done all that a man might to hold out for a long siege. The fortifications were formidable, but so were the German forces. The defence of a large town is no easy problem, since starvation is such an invaluable ally to the besiegers, yet Paris had a great spirit, and hoped greatly for relief from newly formed armies.

Gambetta escaped from Paris in a balloon, and from Tours roused the country to arms; but

it is no easy task hastily to improvise armies, however many high-spirited men may be available. There were no great generals, no trained officer corps; arms and stores were lacking. An army of the north was formed about Soissons and Amiens under Faidherbe, and a numerically stronger Loire army about Orleans. By the beginning of December the Germans had the northern half of France in their grasp. They had taken the large and important fortified towns of Nancy, Strasbourg, Metz, Reims, Dijon, Laon, Soissons, Orleans, and Rouen, and were operating under the able direction of von Moltke with well-found armies in every direction. The army of the Loire was driven from Orleans on Dec. 3, and from that time became a negligible factor for the relief of Paris.

An army had been formed in the Vosges under the leadership of Garibaldi, and fighting in the neighbourhood of Dijon afforded a little distraction, but no real effect. The army of the north was severely defeated early in Jan., 1871. In the S.E. General Bourbaki had collected a considerable force to raise the siege of Belfort, but equal failure attended its efforts; and early in Feb. his army was compelled to retreat over the Swiss frontier and give up its arms.

#### Germany's Peace Terms

It was a terribly severe winter and the sufferings of the ill-found French soldiers were appalling, while the Germans were able to fight in comparative comfort. Paris during January was being regularly bombarded, and in addition was enduring the pangs of hunger. Disease and death were rampant, and the necessity for capitulation had become evident. General Trochu resigned, and Jules Favre was sent to arrange terms of surrender at Versailles, where William, now crowned as German emperor, had taken up his headquarters. Negotiations were opened on Jan. 24; a general armistice was proclaimed and the terms of surrender were definitely settled on the 28th. By the peace treaty, France lost her provinces of Alsace and Lorraine, and paid Germany a war indemnity of £200,000,000.

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**Franc-tireur** (Fr. free-shooter). Term for one of an armed band who, though unconnected with the regular forces, harassed the Germans during the Franco-Prussian War of 1870. These bands wore no uniform, and, if detected, posed as civilians. Francs-tireurs were also organized bodies of volunteers, notably the Gardes Mobiles and an Italian contingent who cooperated with French troops round Orléans. During the First Great War the Germans made accusations especially against the Belgians of the employment of francs-tireurs. The Germans treated members of various resistance movements in occupied territory as francs-tireurs during the Second Great War, though Russian guerrillas and members of underground parties in France were officially recognized as part of the armed forces of their countries. On July 15, 1944, Gen. Eisenhower issued a warning to the German high command that the F.F.I. had been provided with a distinctive emblem and were to be regarded as an army. On the formation of the British Local Defence Volunteers in 1940, it was announced over the German wireless that members would be treated as francs-tireurs. Such irregular forces are given protection by the Hague Regulations. The underground movement in Paris published a paper called the *Franc-Tireur* during the German occupation.

**Franekeer.** Town of the Netherlands. In Friesland, it is 10 m. W. of Leeuwarden, and is served by both rly. and canal. It has a celebrated school, the successor of the university that flourished here from 1585 to 1811. S. Martin's, a 15th century building, is the chief church. There is a 16th century town hall and an observatory. The town has small manufactures and a trade in agricultural produce.

**Frangipani.** Name of a powerful Roman family. It arose in the 11th century, and was conspicuous in the struggles of Guelph and Ghibelline in the two following centuries. Members of it still exist in Italy. Frangipani, sometimes spelt frangipane, is also the name of a powerful scent, and of a kind of sweetmeat.

**Frank, BRUNO** (1887-1945). A German dramatist and novelist. Born at Stuttgart, June 13, 1887, he was educated at German universities. Several of his comedies were translated into English and performed in London and New York, chiefly *Sturm im Wasserglas*,

1930, adapted by James Bridie as *Storm in a Teacup*, which made a popular play and film. His other plays included *Nina*, 1931. Frank later lived at Beverly Hills, Calif. He died June 20, 1945.

**Frank, HANS** (1900-46). German administrator. Frank joined the National Socialist party early and became head of the legal department in 1927. He was Bavarian minister of justice and Reich commissioner for justice, 1933-35, and in the Hitler government continuously from Dec., 1934. As governor-general of Poland, 1939-45, he was responsible for the mass slaughter of hundreds of thousands of Poles and Jews; on Jan. 30, 1942, he issued a decree depriving the Polish people of their nationality. He was captured on May 5, 1945, by U.S. troops near Berchtesgaden, and indicted as a major war criminal at Nuremberg. Sentenced to death by hanging, he was executed Oct. 16, 1946.

**Frank, KARL HERMANN** (1898-1946). German politician. A bookseller by trade, he was an original member of the Sudeten German party in Czecho-Slovakia and one of its directors from 1936. Frank was deputy *Gauleiter* for Sudetenland in 1938 and state secretary for the German protectorate of Bohemia-Moravia in 1939. He was responsible for much bloodshed among the Czechs on Oct. 28, 1939, and for the massacre at Lidice (*q.v.*), June, 1942. He was captured by Allied troops in May, 1945, and tried by Czech authorities a year later. Found guilty of crimes against humanity, Frank was publicly hanged at Prague May 22, 1946.

**Frank Almoign.** Term of French origin, meaning free alms. It is used for the kind of land tenure by which religious houses and corporations held their lands, and to some extent do so still. The idea behind it is that the land is held on the condition that, instead of military service, religious offices shall be performed. This form of tenure is very old, and was not confined to England. There it was largely stopped by the famous Act of 1290, which forbade any such tenures to be created save by the king. See *Land Laws*; *Quia Emptores*; *Tenure*.

**Frankau, GILBERT** (1884-1952). British novelist. His father was a tobacco merchant, his mother the popular novelist who wrote as Frank Danby. Gilbert was born April 21, 1884, educated at Eton, and entered his father's firm. He

published *One of Us*, a novel in verse, in 1912. His first prose novel, *A Woman of the Horizon*, appeared in 1917, and in 1919 he established his reputation as a best-seller with *Peter Jackson, Cigar Merchant*. Later novels included *Masterson*, 1926; *Christopher Strong*, 1932; *The Lonely Man*, 1932; *The Dangerous Years*, 1937; *Winter of Discontent*, 1941; *World Without End*, 1943; *Oliver Trenton*, 1951. Frankau died Nov. 4, 1952.

His daughter Pamela became a well-known journalist, author, and broadcaster. His younger brother Ronald (1894-1951) was an entertainer of stage and radio, specialising in patter songs and stories whose wit lay in what he did not say. His cross-talk act as Mr. Murgatroyd to Tommy Handley's Mr. Winterbottom made them a popular pair.

**Frankenburg.** Town of E. Germany, in Saxony. It stands on the Zschopau, an affluent of the Mulde, 32 m. S.W. of Dresden. It is a manufacturing centre, and among its products are cotton, woollen, and silk stuffs. Pop. 14,000.

**Frankenhausen.** Town of E. Germany. It lies on a branch of the Wipper at the foot of the Schlachtberg, 27 m. N. of Erfurt. It has extensive natural deposits and salt springs celebrated for the cure of rheumatic complaints, which are employed locally for thermal baths and exported for use as the basis of laxative salts. The buildings include a palace and three medieval churches. There was a local market for undressed wool. Near here the rebellious peasants under Münzer were defeated in one of the last battles of the Peasants' War (1525). A cave in which Barbarossa, surrounded by his warriors, is said to sleep, is in the neighbourhood. Pop. 7,010.

**Frankeniaceae.** Small family of herbs and small shrubs. Natives of temperate and warm regions, they are chiefly seashore plants. They have joined branches, small, opposite leaves, and small, solitary, regular flowers. The familiar sea heath (*Frankenia laevis*) of salt-marshes is a type.

**Frankenstein.** Novel by Mary Wollstonecraft Shelley, first published anonymously in 1818, with the title *Frankenstein, or the Modern Prometheus*. It is the story of a man who succeeds in making a monster, and giving it life, and of the awful consequences. Frankenstein is the name of the man, not of the monster he creates. Boris Karloff portrayed the monster in a film, 1932.

**Frankenthal.** Town of Germany, in the Rhineland-Palatinate. It stands on the Isenach, 7 m. S. of Worms. It received a charter of township in 1577. It is connected by canal with the Rhine,  $3\frac{1}{2}$  m. distant. The place is distinguished by the width and regularity of its streets and its imposing public buildings. It had a considerable trade in wine and its light beer was famous. The town was destroyed by the French in 1689 and severely damaged in the Allied advance of 1945.

**Frankenwald.** North-western spur of the Fichtelgebirge mts. in Bavaria, situated between the rivers Saale and Main. The highest peak is the Döbraberg (2,605 ft.).

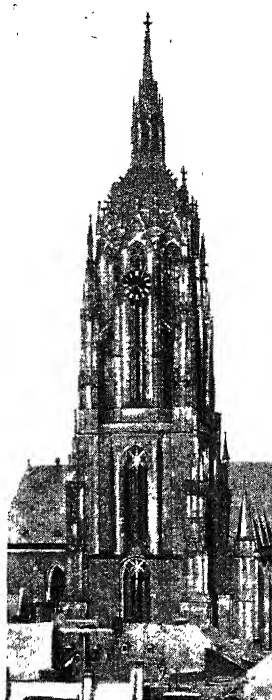
**Frankfort.** City of Kentucky, U.S.A. It is capital of the state and the co. seat of Franklin co. On the Kentucky river, here spanned by a fine suspension bridge, 55 m. E. of Louisville, it is served by the Chesapeake and Ohio and other rlys. In addition to the capitol, it has an arsenal, reformatory, and a coloured industrial college. Daniel Boone is buried here. In the heart of the "blue grass" country of tobacco, maize, hemp, and horses, Frankfort manufactures lumber products, furniture, barrels, brooms, and shoes. The city, founded 1786, became state capital in 1792, and was chartered in 1839. Pop. (1950) 11,916.

**Frankfort-on-Main.** City of Germany. From A.D. 1356 it was the coronation town of the German emperors, free city, capital of the German federation from 1815 until its annexation by Prussia in 1866, and Germany's main financial and trading centre until, about the turn of the century, superseded by Berlin. Situated on both banks of the river Main, 24 m. from its junction with the Rhine, Frankfort was on the main trade route from Italy and the Near East to Flanders and Britain: a situation that not only brought great wealth to the city, but also an international cultural development in advance of most other German towns. Architectural and artistic remnants of many centuries testified to that richness until, during the Second Great War, most of them were destroyed.

Frankfort—Frankfurt, the ford of the Franks, in German—had in 1935 a pop. of 555,857; in 1950, 532,000; in 1953, 601,700. After the Second Great War it soon began to recover importance as an inland shipping centre, since it is on the Main-Danube canal, which can carry barges up to 1,200 tons,

and is at the junction of six main railway lines. Its industrial importance derived from the fact that the huge chemical and dye trust, I. G. Farbenindustrie, had its seat there; while several large motor car, electrical, and engineering factories, as well as leather, shoe, furniture, etc., plants were established in and around Frankfort. Finance and trading, however, the latter largely by way of two annual fairs, were yet more important; there were no less than 30 important banks, including until 1901, when their Frankfort branch died out, the original firm of Rothschild. Frankfort's historical associations include the birth of Goethe.

The inner town, north of the river, held most of the city's historic buildings, foremost among them the Roemer, an old town hall embracing several buildings of the early 15th century, with the election chamber, where the electors chose the German kings, and the Kaisersaal, the imperial banqueting hall for the coronation feast vividly described by Goethe. This banqueting hall held a gallery of portraits of all the Holy Roman Emperors from Charlemagne to Francis II. The fountain of justice, from which wine ran freely during a coronation, stood on the Roemerberg, the market place in front of the Roemer; it dated from 1543. Near by is the cathedral, heavily damaged in the Second Great War, an impressive Gothic pile built from 1239 onwards on the site of a 9th century church. S. Leonard's, 1219, S. Nicholas's, 1270, restored in the 15th century, and two heavy towers once guarding the walls of the city, with a number of fine-patrician houses, were other surviving remnants of Frankfort's medieval glory. Our Lady, a fine old R.C. church of 1318, reconstructed, and S. Catherine's, a Protestant church, erected in the 17th century, the Saalhof with a Romanesque chapel, likewise re-



Frankfort-on-Main. Fifteenth century tower of the cathedral, which escaped serious damage in the Second Great War

newed in that period and said to be Frankfort's oldest edifice, deserve mention; the palace of the Thurn and Taxis princes, seat of the federal parliament 1816 to 1866 and later part of the central post office, and, finally, S. Paul's, completed 1833, and 1848-49 seat of the Frankfort parliament (*q.v.*), were other piles with historical associations. The Old Bridge, one of the seven crossing the Main, dated back to the 14th century and carried a mill and a statue of Charlemagne.

The town outside the former walls, which had been transformed into a pleasant, encircling garden with numerous lakes, good monuments, and wells, had broad streets and avenues, and many

impressive buildings: the splendid opera house (1873-80), the city's theatre, the main railway station, the law courts, a huge hall for festivals and exhibitions, the buildings of the university, established in 1912 on the basis of old seats of learning such as the Senckenberg museum of natural history, an ethnological and several art and artoraft museums, and great hospitals. The outstanding Frankfort gallery was the Staedel museum in the S. suburb of Sachsenhausen, with numerous world-famous pictures and a neighbouring collection of sculptures.

Frankfort's schools were famous for their buildings as well as for their progressive methods, in particular the Goethe gymnasium whose former headmaster, Carl Reinhardt, reformed all the secondary teaching in Prussia before the First Great War. In the suburbs the house of the Teutonic Knights, in Sachsenhausen, and the town hall, formerly a palace, as well as the 9th century church of S. Justinus, in Hoechst, deserve mention. The Frankfurter Zeitung, a leading German democratic paper, enjoyed a world reputation; so did the botanical

Palmergarten, the zoological garden, and the Rothschild library.

Originally a Roman military post, Frankfort, as Franconofurd, is first mentioned in A.D. 793. Here Charlemagne held a diet in 794; Lewis the Pious built the Saalhof, as an imperial palace, in 822, and many of his successors resided there. In 1220 the town received its freedom, later privileged fairs and, by the Golden bull of 1356, was established as coronation seat. In 1533 the Reformation reached Frankfort, which joined the Schmalkalden pact against the Catholic league in 1536. The wealthy city suffered heavily during the Thirty Years' war, the wars of Frederick the Great, and the wars of the French Revolution; it was taken by Napoleon in 1806 and embodied in a grand duchy of Frankfort, but became a free city again in 1815, and the seat of the federal parliament. After having been the scene of Germany's earliest attempt at democracy and union in a new empire, Frankfort was allied with the S. German states and Austria in the 1866 war against Prussia, and annexed by Bismarck after the Prussian victory. The peace between France and Germany was concluded there, May 10, 1871. The spirit of democracy of the Frankfurters never vanished; they always sent left-liberal or socialist deputies to the Reichstag, and neither William II nor Hitler showed any favour to the old city.

Frankfort, owing to its industrial importance, was heavily bombed by the Allied air forces during the Second Great War. Columns of the U.S. 3rd army fought their way into the S.W. suburbs on March 26, 1945, but the city was not cleared until the 29th. Hardly a house was undamaged. The ancient town hall, the adjacent market place, Goethe's birthplace (a replica of which was built 1949), the museum next door, and the fashionable shopping centre were in ruins. The opera house and the cathedral were very heavily damaged, although the cathedral tower had suffered comparatively lightly. The Supreme Headquarters of the Allied Expeditionary Force was transferred to Frankfort in May, 1945, until its disbandment the following July. The city became the headquarters of the U.S. zone of occupation in Germany, and during 1947-49 the centre of administration of the joint Anglo-American zone.

**Frankfort-on-Oder.** Town of E. Germany, capital of a region

of the same name, c. 50 m. E.S.E. of Berlin, on the left bank of the Oder. (Damm, Pol. Slubice, a suburb on the right bank, came under Polish administration in 1945.) Its chief old buildings are the 13th cent. church of S. Mary and the town hall. It has many modern buildings. The university, founded 1506, was transferred in 1811 to Breslau. Frankfort had manufactures of machinery, chemicals, etc., but its prosperity was chiefly due to its trade; it was a port on the Oder, and also a big rly. junction. Frankfort was settled by merchants from Franconia in the 13th century. It was then part of the electorate of Brandenburg, and for a time was a member of the Hanseatic League. Its situation has brought many sieges and sufferings upon it, and made it an important military centre before the First Great War. In the Second it was taken by Russian troops, April 23, 1945, after a protracted battle which burnt out the centre of the town. Pop. (est.) 76,000.

**Frankfort Parliament.** Meeting of representatives of the German people at Frankfort-on-Main in 1848. It was a constituent elected representation resulting from the German revolution. The previous federal diet of the autocratic German governments had to give way when the deputies of the diets of the individual states met in Frankfort and enforced a general election by ballot. With one deputy to 50,000 electors, the parliament, assembling on May 18, had 568 members, Germany's intellectual *élite*. It split into groups of Republicans, Liberals, Constitutionalists who wanted a copy of the British system, and Roman Catholics. Although the project elaborated by the committee of the governments tended towards an empire led by Prussia and excluding Austria, the assembly chose Archduke John of Austria as provisional regent.

The Prusso-Danish war, during which Prussia disregarded an order from the Frankfort parliament to withdraw, led to a sanguinary revolt in Frankfort, during which two Right-wing deputies were killed; this showed the assembly unable to prevail against the bigger member states. Discredited thereby, it continued its constitutional work and, after long debate as to whether Austria, with her large non-Germanic population, should be included in the empire, and whether the crown was to be offered to her ruler or to the king of Prussia,

found a compromise in a formula proposed by the chairman, von Gagern. Prussia would hold the crown, but the empire would be linked with Austria by a permanent treaty of alliance. Austria as well as Prussia objected; but on March 27, 1849, the bill creating a hereditary imperial power was accepted and Frederick William IV of Prussia was elected with 290 votes and 248 abstentions.

Austria, thereupon, recalled her deputies; Frederick William refused because he did not want an honour by "the grace of rebels." Only the smaller states accepted the new constitution; Gagern's shadow cabinet resigned; Prussia ordered her deputies back, while in Central and S. Germany revolts broke out to enforce the new constitution on reluctant governments. After the Hanover and Saxon deputies had been called back, a rump parliament, mostly of the Left, transferred itself to Stuttgart where on June 18 it was dissolved by force. The first German attempt at establishing democracy had failed. But its labours were not entirely lost; after solving by force the knotty problem over which the Frankfort parliament had perished, the question of "Greater Germany" or "Little Germany," Bismarck was to build the German empire of 1871.

**Frankfurter Zeitung** (Frankfort Gazette). Founded in 1856 as the Frankfurter Handelszeitung (Trade Gazette) by Leopold Sonnemann, it became the first paper in the German empire in authority and influence, the leading financial organ, and on foreign affairs a mouthpiece of the foreign office in Berlin. It was abolished in the Second Great War.

**Frankincense** (old Fr. *franc encens*, true incense). Fragrant gum exuded from several trees of the genus *Boswellia*. It is abundant on the Somali coast and in South Arabia. A cut is made in the tree trunk, and the weeping resin coagulates in breast-shaped globules which are scraped off and shipped to Bombay. Here the commodity is graded and re-exported to the various markets.

The ceremonial religious use of frankincense is of great antiquity, having been practised by the Egyptians, Persians, Babylonians, and Assyrians; by the Jews as a constituent of the incense of the sanctuary (Ex. 30, v. 34), and by the Greeks and Romans. Although European medical science today discounts its medicinal value, it was

long employed in the East as an external application for tumours and sores, and, in China, as an internal remedy for leprosy and other diseases. *See* Incense.

**Franking** (Fr. *franc*, free). Free use of the postal service. To the extent of sending ten letters a day and receiving fifteen, it was a privilege granted to both the house of lords and the house of commons in 1764. With the introduction of penny postage in 1840 it was abolished, but letters are still franked by the public departments, and, if so franked, can be sent thereto free of charge. *See* Post Office.

**Frankland, Sir Edward** (1825-99). British chemist. He was born at Churchtown, Lancashire, Jan. 18,



Sir E. Frankland,  
British chemist

1825, and educated at Lancaster grammar school, Royal School of Mines, London, and the universities of Marburg and Giessen. In 1850 he discovered the

zinc compounds of methyl and ethyl, and next year was appointed professor of chemistry at Owens College, Manchester. He was professor of chemistry at S. Bartholomew's hospital, London, 1857-63, and at the Royal Institution, 1863-67. His chief work was done as a member of the royal commission on the Pollution of Rivers, in a laboratory provided by the government. He died in Norway, Aug. 9, 1899.

**Franklin** (late Lat. *francus*, free). A freeman. The word was used in medieval England as a mark of distinction, though without any exact meaning. It seems to have referred primarily to a class of landholders between the noble and the more or less unfree; the country squires of a later day. Such doubtless was the franklin in The Canterbury Tales.

**Franklin, Battle of.** Engagement of the American Civil War Nov. 30, 1864. General Schofield, with 25,000 Federal troops, was retreating to Nashville, Tennessee, when, as he was crossing the Harpeth river at Franklin, he was attacked by a Confederate army of 40,000 men under Hood. At first thrown into confusion, the Federals rallied, and, after a furious resistance, Schofield succeeded in withdrawing his men across the river. In no battle of the Civil War was greater determination or resistance shown on either side. The losses were very heavy; those

of the Federals being 2,326 killed, wounded, and missing, those of the Confederates more than 6,000.

**Franklin, Benjamin** (1706-90). American statesman and scientist. The son of an English immigrant, a tallow chandler, Benjamin Franklin was born at Boston, Mass., Jan. 17, 1706, and was apprenticed in 1719 to his eldest brother, a printer. He moved to Philadelphia in 1723, and while working there as a compositor attracted the attention of the governor of Pennsylvania, Sir William Keith (1680-1749), who encouraged him to go to England to buy printing materials wherewith to set up in business. Franklin accordingly made his way to London in 1725, but Keith's promises proved illusory and he had to take employment as a compositor. After a troubled eighteen months in London, he returned to Philadelphia, again as a printer's assistant.



*Benjamin Franklin*

After J. H. Duplessis

In 1729 he purchased a weekly journal, The Pennsylvania Gazette. Three years later he issued his Poor Richard's Almanack, which continued to appear for 25 years, and was widely popular for its wealth of prudent maxims on industry and thrift. He became postmaster of the city in 1737, clerk to the General Assembly from 1736-51, and a member from 1751-64, attracting notice by his scheme for intercolonial union at the Albany Convention, 1754.

Meanwhile Franklin had added scientific research to his many activities. About 1746 he began to investigate problems connected with electricity, his work leading

to the invention of the lightning conductor in 1749. Earthquakes, meteorology, stoves and chimneys, ocean currents and navigation were all among the many subjects of his inquiries during these years; his experiments with the pouring of oil on stormy water and with agricultural fertilisers showed the versatility of his mind.

In 1757 he once again crossed to England; this time as the agent of Pennsylvania in the colonial dispute with the Pennsylvanian proprietors. Franklin was widely welcomed, became known to many distinguished figures in political and literary life, and received degrees from the universities of Oxford, Edinburgh, and St. Andrews. In 1762 he went back to America, but 1764 found him again in London in his former capacity. In 1766 he gave evidence before the house of commons which was largely instrumental in the repeal of the notorious Stamp Act. The unfortunate publication of certain letters entrusted to him for private circulation led to difficulties in London, and he returned to Philadelphia in the spring of 1775.

His old affection for the English connexion, weakened perhaps by this rebuff, turned into an active sympathy with the separationist policy. He was one of the five members commissioned to draft the Declaration of Independence in 1776, and in that year he went to Paris as commissioner for the colonies. He negotiated the alliance between America and France, and was then appointed plenipotentiary in Paris, where he remained throughout the war, negotiating the treaty of peace finally signed in 1783. He returned to America in 1785 and took some part in framing the new constitution of the United States, retiring from public life in 1788. He died at Philadelphia, April 17, 1790.

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**Franklin, Sir John** (1786-1847). British explorer. Born at Spilsby, Lincolnshire, April 16, 1786, and educated at Louth grammar school, he entered the navy as a midshipman in 1801 being present at the battle of Copenhagen. He

took part between 1818-27 in three Arctic expeditions, during which he surveyed many thousand



John Franklin

miles of Arctic - American coast-line and the Saskatchewan, Coppermine, and MacKenzie river basins. He was promoted captain, knighted 1829, and awarded scientific distinctions at home and abroad. During 1836-43 he was governor of Van Diemen's Land (Tasmania).

A new British expedition, consisting of the ships Erebus and Terror, with Franklin in command, intended to explore the N.W. Passage, sailed from the Thames on May 19, 1845. The vessels were last sighted in Baffin Bay. Franklin had proposed to return in 1847, and, no tidings being received from him, no fewer than 39 expeditions, four at Lady Franklin's expense, were sent forth from Great Britain and America in ten years. Some traces of them were found by Captains Ommanney and Penny, and Dr. Rae. In 1857 Lady Franklin equipped the yacht Fox and dispatched it to N.E. America under Captain, afterwards Sir, Leopold McClintock; and in June, 1859, a cairn was found at Point Victory in which was a record of Franklin's expedition down to April 25, 1848, with definite proof that he had discovered the N.W. Passage, and that he had died on June 11, 1847. Parliament voted £2,000 for the statue in Waterloo Place, London, and Lady Franklin erected the monument in Westminster Abbey. See Arctic Exploration.

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**Franklinite.** Ore mineral of zinc containing up to 23 p.c. of that metal. It is abundant in the zinc mines of Franklin, New Jersey, where it occurs with other zinc and manganese minerals in crystalline limestone. Chemically an oxide of zinc, manganese, and iron, it is a member of the magnetic series in the spinel group. In appearance franklinite resembles magnetite occurring in black,

opaque, isometric crystals and granular masses, but is only feebly magnetic.

**Frankpledge.** System by which a group of men were held responsible by the state for each other's misdeeds. The Anglo-Saxons called these associations *frithborhs*, and membership was imposed by law upon all freemen. William the Conqueror ordered every freeman to be in a frankpledge, which appears to have consisted of ten or twelve men, and later kings made like regulations. Sheriffs held periodical "views" of frankpledge, i.e. courts to see that the law was being obeyed. After a time the unfree were admitted to membership, and the free dropped gradually out. The system did not survive the advent of the Tudors, although courts for the view of frankpledge remained for some time longer. See Jury.

**Franks** (late Lat. *francus*, free). Group of tribes dwelling in Europe in the 3rd century, who founded the kingdom of France, to which they gave their name. They are first mentioned in writing in reference to a victory obtained by Aurelian over some of them near Mogontiacum (Mainz) in 241.

The Frankish tribes were of Teutonic origin and were first found in what is now N.W. Germany and the Netherlands. They bore various names until by one of the accidents of history that of Franks began to prevail over the others and gradually supplanted them.

In the 4th century or a little later the Franks were divided into two main branches: the Salian Franks around the mouth of the Rhine and the Riparian Franks higher up the river. They were first enemies and then tributaries of the Romans, and the decay of the Roman empire was their hour. The man to use it was Clovis, descendant of one Chlodio, who had led the Salian Franks into what is now France and had made Tournai his capital. Thirty years before he became king in 481 his tribe had sent warriors to that vast host that defeated the Huns in 451.

Clovis united many of the Salian Franks under his rule, and conquered much of Gaul. He made the Riparians, who had spread up the Rhine as far as Alsace, own his authority, and when their own king was murdered they took the Salian in his stead. Clovis was baptized as a Christian, and nominally at least the Franks were no longer pagans. His sons continued his career of conquest, and soon Frankland was a great district

lying on both sides of the Rhine, the name being perpetuated in the German district of Franconia. Like Anglo-Saxon England, it was divided into more or less independent kingdoms, such as Austrasia and Neustria, but, in spite of civil wars, there was a certain brotherhood between them.

This union of Frankish tribes under Clovis and his descendants formed that Frankish realm which has so greatly influenced European history. It existed in one form or another from about 500 to about 900 reached its height in the great but transient empire of Charlemagne, and from its ruins both France and Germany arose. It included parts of both, but soon a cleavage showed itself between E. and W. Franks, and early in the 9th century the one folk could not understand the speech of the other.

A definite division was made in 817 and soon afterwards the E. Franks became Germans and the W. Franks became French. The boundary between them was not easily drawn: indeed, it may be said to have been a prime cause of a thousand years of intermittent European warfare. There was usually a "middle kingdom"—Lotharinga, Lorraine, or Burgundy. France added Celtic elements from the S. and W. to her Franks: Germany added Slavonic ones from the E. to hers, and the two developed into distinct nations.

Gregory of Tours, the chief authority for the early history of the Franks, and other writers, describe the customs and habits of these people in peace and war, which do not seem to have differed much from those of other Teutonic tribes.

**Franks, Sir Augustus Wol-**  
**LASTON** (1826-97). British antiquary. Born at Geneva, March 20, 1826, he was educated at Eton and Trinity College, Cambridge. After being assistant in the department of antiquities in the British Museum, he became keeper of medieval antiquities and ethnography, 1866. He was tellow director, and during 1891-97, president of the Society of Antiquaries, was made F.R.S., 1874, and K.C.B. in 1894. He applied large private means to purchasing porcelain and other objects of Oriental and medieval art, and enlarging the Henry Christy ethnographical collection. He presented or bequeathed most of his acquisitions to the British Museum. He died in London, May 21 1897.

**Franzen, FRANS MIKAEL** (1772-1847). Swedish poet. Born at Uleåborg (Oulu), Finland, Feb. 9,

1772, and educated at Åbo (Turku) university, where he was later a professor of history, he left Finland in 1811, after the country had passed into the hands of Russia. He was for many years rector of a parish in Stockholm, and in 1834 was made bishop of Hernösand. He was one of the most widely appreciated of Swedish hymn-writers, and his ode to Count C. P. Creutz, the Finnish Academy poet, was crowned by the Swedish Academy. He died Aug. 14, 1847.

**Franzensfeste.** An old fortress, one of a line of fortifications constructed to defend the Austrian frontier in Tirol. It commanded the railway line which passes between Innsbruck and the Brenner Pass and through the valley of the Puster to Klagenfurt.

**Franz Josef.** Glacier in the Southern Alps of New Zealand. It flows to within 600 ft. of sea level and discharges into the Waiho river over 15 m. from the sea. It is 8½ m. long.

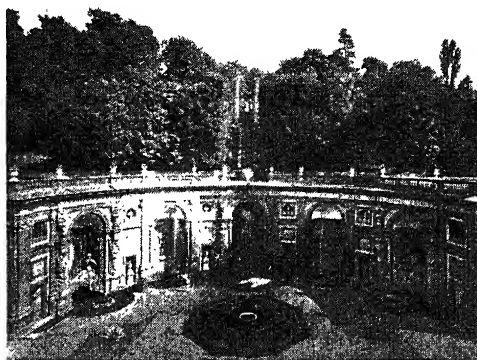
**Franz Josef Land** OR FRIDTJOF NANSEN LAND. Russian archipelago in the Arctic Ocean, lying N. of Novaia Zemlia and N.E. of Spitsbergen in lat. 80° to 82° N. and long. 42° to 64° E. The archipelago consists of about 100 small islands, chief of which are Rudolf and Hooker Is. They are mountainous, of volcanic origin, and for the most part covered by glaciers; but on the shores and in other favoured spots mosses, poppies, saxifrages, and other Arctic plants grow. The loftiest point rises to 2,800 ft. The islands are inhabited by bears, walrus, seals, foxes, and birds. There are government observation stations on Hooker I. and Rudolf I.

Discovered by the Austrian explorers, Payer and Weyprecht, in 1872, the islands were further explored by Leigh Smith in 1880-81, the Jackson-Harmsworth expedition in 1895-96, and by the duke of Abruzzi's expedition in 1899-1900. The sea on the N. is called Queen Victoria Sea; the wide opening S. of it is known as the British Channel, and its westernmost point is Cape Mary Harmsworth.

**Franzos, KARL EMIL** (1848-1904). German novelist. He was born, the son of a Jewish doctor, in Podolia, Oct. 25, 1848. Having educated himself, he entered the legal profession, but left it for journalism. After living for some years in Vienna, he settled in Berlin, where he founded, in 1886, the fortnightly review, *Deutsche Dichtung*. His many works of

fiction deal largely with Jewish life, and abound with pathetic incidents. Notable are *The Jews of Barnow*, 1877, Eng. trans. 1882; *For the Right*, 1882, Eng. trans. 1887; and *Der Präsident*, 1884, Eng. trans., *The Chief Justice*, 1890. In his *Aus Halb-Asien*, 1876, are sketches of life in S. Russia and Rumania. He died Jan. 28, 1904.

**Frascati.** City, episcopal see, and summer resort of Italy. In the prov. of Rome, it stands on the



Frascati, Italy. Colonnade and cascade in the gardens of the Villa Aldobrandini

slopes of a wooded hill, at an elevation of about 1,050 ft., 15 m. by rly. S.E. of Rome. The cathedral, founded in 1700, contains a tablet to the Young Pretender, interred here in 1788. The building was badly damaged by bombing from the air during the Second Great War, as were the villas Aldo brandini, Ruffinella, Torlonia, Lancelotti, and the oldest of them all, Falconieri (earlier than 1550). Near by are the remains of numerous ancient villas, an amphitheatre, a theatre, and a reservoir belonging to the town of Tusculum, which was destroyed in 1191. Between the ruins of the ancient city and Frascati, the villa of Cicero once stood, and on its site some monks in the 11th century built a convent. Frascati is famous for its wine. Pop. (1951) 12,960.

**Fraser.** River of Canada, in the prov. of British Columbia. Rising in the Yellowhead Pass in two branches, it flows N.W. for the first 277 m. of its 785 m. course; it then takes a hairpin bend round the head of the Cariboo Mts., receiving the waters of the Nechaco at Fort George, and flows almost due S. 413 m. to Hope, after which it flows W to its outlet in the Strait of Georgia at New Westminster. Important

tributaries are the Thompson, Stuart, Nechaco, Chilcotin, Bridge, and Blackwater; among the lakes drained are the Stuart, Fraser, François, and Quesnel. It is notable for its salmon fisheries and hatcheries, but is navigable only 80 m. from its mouth. The area of the basin is 88,698 sq. m.

**Fraser.** Name of a famous Scottish family. It is supposed to be a corruption of Frisel and to be of Norman origin. Early Frasers settled in the S. of Scotland in the 12th century, but soon they moved N. and established themselves in the shires of Inverness and Aberdeen. They became one of the most powerful of the Scottish clans. Among the places owned by the Frasers was Lovat, and one of them, Hugh Fraser, was made Lord Lovat about 1430. He was a grandson of Sir Simon Fraser, sheriff of Tweeddale, and from him are descended the later lords Lovat and a number of other branches of Frasers. Another branch of Frasers is now represented by Lord Saltoun, whose family name is commemorated in Fraserburgh.

**Fraser** OF NORTH CAPE, BRUCE AUSTIN FRASER, BARON (b. 1888). British sailor. He was educated at Bradfield. A specialist in air-sea strategy, Fraser was given command of the aircraft carrier *Glorious* (q.v.) in 1936. He later became chief of staff, Mediterranean Fleet, and at the outbreak of the Second Great War was 3rd sea lord and controller at the Admiralty. In 1942 he was second in command of the Home Fleet, and on March 23, 1943, succeeded Admiral Tovey as c.-in-c. Fraser was in personal command of the units which on Dec. 26, 1943, sank the German battleship *Scharnhorst* (q.v.) off the North Cape (whence his title). He was also responsible for the tactics which twice put the Tirpitz (q.v.) out of action. He



Lord Fraser, British sailor



organized many convoys to Russia and accompanied one in his flagship Duke of York. Promoted admiral in 1944, he commanded the new British Pacific Fleet, 1945-46. In 1946 he was made a peer. C.-in-C. Portsmouth, 1947, he was promoted admiral of the fleet 1948 and was 1st sea lord 1948-51.

**Fraser, CLAUD LOVAT** (1890-1921). British artist. Born May 15, 1890, he studied painting under Sickert (*q.v.*) and before the First Great War achieved success as an illustrator and designer for the theatre. His bold, simple décor with its vivid colour greatly



Claud Lovat Fraser,  
British artist

contributed to the success of Playfair's revival of *The Beggar's Opera* in 1920. Although strongly influenced by the rococo style, he showed in his work an 18th-century robustness that was wholly English. He was an authority on the history of costume. He died June 18, 1921.

**Fraser, SIR IAN.** This British administrator is noticed under his full name, W. J. I. Fraser.

**Fraser, JAMES** (1818-85). British prelate. Born at Prestbury, Glos, Aug. 18, 1818, son of a merchant, he was educated at Shrewsbury School and Lincoln College, Oxford. Having been a tutor at Oriel, he was ordained in 1846. He held livings in Wiltshire and Berkshire, and was chancellor of Salisbury. In 1870 he was chosen bishop of Manchester, and worked in that diocese until his death there, Oct. 22, 1885. He was the real founder of the diocesan organization, was chosen as arbitrator in several industrial disputes, and was unwillingly the defendant in a case arising out of ritualistic practice. Specially interested in education, Fraser studied this subject thoroughly as an assistant commissioner in Salisbury diocese.

**Fraser, MARJORY KENNEDY** (1857-1930). Scottish writer. Daughter of the singer David Kennedy, she was born at Perth, Oct. 1, 1857, and was taught singing by her father, and by Mathilde Marchesi in Milan and Paris. In 1905 she visited the Outer Hebrides, and devoted the rest of her life to collecting and editing Hebridean folk songs; she published a first vol. in 1909, a second in 1917, a third in 1921. She wrote the libretto for Bantock's *The Seal*

Woman, 1924, the music of which was founded on Hebridean melodies. Her autobiography appeared in 1929. She died Nov. 22, 1930.

**Fraser, PETER** (1884-1950). Scottish-born working man who became prime minister of New Zealand. Peter Fraser was born Aug. 28, 1884, at Hill of Fearn, Ross, Scotland, the son of a shoemaker, and worked as a carpenter. Joining the Independent Labour party in London in 1908, in 1910 he emigrated to New Zealand, where he worked on the waterfront at Auckland and Wellington and identified himself with the Labour movement of his new country. He entered the house of representatives in 1918 as member for Wellington Central, and held the portfolio of education, health, and marine, 1935-40. He carried New Zealand's social security scheme through parliament, 1938. In 1940 he became premier, visiting Washington in 1942 and 1945; London for war cabinet meetings 1941; for the first U.N. general assembly, 1946; and for Commonwealth conferences, 1948 and 1949. Resigning 1949 after electoral defeat, he died Dec. 12, 1950. *Consult* Life, J. Thorn, 1952.

**Fraser, SIR (WILLIAM JOCELYN) IAN** (b. 1897). British administrator. Educated at Marlborough and Sandhurst, he enlisted in 1915 in the First Great War, in which he was blinded. As chairman of St. Dunstan's from 1921, he became famous for his great work on behalf of the blind and for overcoming this disability in pursuing his personal career. He was Conservative M.P. for North St. Pancras, 1924-29 and 1931-36, for Lonsdale 1940-50, for Morecambe and Lonsdale from 1950; a governor of the B.B.C., 1937-39 and 1941-46; and a barrister of the Inner Temple from 1932. Knighted 1934, he was made C.H. in 1953. He published an autobiography, 1942.

**Fraserburgh.** Police burgh, seaport, and fishing town of Aberdeenshire, Scotland. It stands on



Peter Fraser,  
New Zealand  
politician

the W. shore of Fraserburgh Bay, and on the S. side of Kinnaid's Head, 47 m. N. of Aberdeen. The chief centre of the Scottish herring fishery, it exports agricultural produce and imports coal. It has a large and good harbour, with piers and a breakwater. There are remains of the castle of the Frasers, and a noteworthy town cross. The town was named after Sir Alexander Fraser who in 1613 made it into a burgh; he also obtained permission to found a university here, and buildings were begun, a tower of which still stands. Market day, Tues. Pop. (1951) 10,444.

**Fraser-Simson, HAROLD** (1878-1944). British composer. Educated at Charterhouse, he abandoned a commercial career for music. He had a gift of easy, flowing melody, and his chief works were musical comedies; the first, *Bonita*, 1911, was succeeded by the most successful, *The Maid of the Mountains*, 1917. Later came *A Southern Maid*, 1920; *The Street Singer*, 1924; *Betty in Mayfair*, 1925. His most ambitious work was *Toad of Toad Hall*, 1929, an operetta based on Kenneth Grahame's *The Wind in the Willows*. His most popular songs were those with words from A. A. Milne's *When We Were Very Young*. He died as the result of an accident, Jan. 19, 1944.

**Fraternity.** Society of students in the U.S.A. Fraternities in colleges have the object of promoting social intercourse, good scholarship, and athletic ability. Greek letters are used to name them, and each has a distinguishing badge, bearing the symbols and monogram. The first society, Phi Beta Kappa, was instituted in 1776, and there are more than 40 men's fraternities, the women's sororities numbering 20.

**Fraticelli** (dim. of Ital. *frate*, brother). Group of religious orders in medieval Italy. Originating in the Franciscan order in the 13th century, when the more zealous members of that order discountenanced the possession of money or property, it took a powerful hold on the popular imagination and gained many recruits. Carried away by their zeal, they regarded themselves as the true representatives of the Catholic church and elected popes, thereby bringing upon themselves the heavy hand of the Inquisition. Persecution increased until 1449, when constant imprisonments and executions deprived them of their leaders, and the Fraticelli died out.



**Fratricide** (Lat. *frater*, brother; *caedere*, to kill). Killing a brother or sister. In English law it is on the same footing as any other homicide, but in some ancient systems was a special species of crime, punishable more severely than killing a stranger. See Murder.

**Fraud** (Lat. *fraus*, deceit). An English legal term, for which no comprehensive definition exists. The essence of the matter is deceit—some statement or suppression of fact in word or deed with intent to deceive. When a man sues on the ground of fraud, or claims property fraudulently withheld from him, his right of action begins to accrue from the time he discovers the fraud, and not from the time it was perpetrated upon him. Some frauds are criminal, but not all. But a conspiracy to defraud is always criminal. If a person has been induced to enter into a contract, or to transfer property by fraud, he can always, on discovering it, have the contract or transfer set aside; but he must be careful to take steps immediately. And he cannot recover his property as against some innocent purchaser who has bought it without notice of the fraud.

**Frauds, STATUTE OF.** English law passed in 1676. Its design was to substitute written for verbal evidence in large classes of transactions, and so diminish liability to fraud and perjury. Conveyances, wills, and leases of land, except tenancies of less than three years, were required to be in writing and signed by the party or his agent. It was also enacted that no action should be brought upon certain agreements unless the plaintiff could prove the agreement by writing duly signed by the defendant or his agent.

These agreements were: (1) A promise by an executor or administrator to pay the deceased's debt or damages out of his own pocket; (2) a guarantee; (3) an agreement in consideration of marriage; (4) a contract, sale of lands, or tenements or hereditaments, or any interest in or concerning them; (5) an agreement not to be performed within a year from the making thereof. As to (3) it was soon held not to include a promise to marry; the consideration for which is not marriage, but a promise to marry by the other party. (4) has been substantially re-enacted by the Law of Property Act, 1925. A law revision committee in 1937 recommended its repeal. The section dealing with contracts for the sale of goods of the value of £10

and upwards has been repealed and almost re-enacted by the Sale of Goods Act, 1893; and other sections, which made writing necessary for a will of lands, have also been repealed, and the subject of wills generally dealt with by the Wills Act, 1837.

The statute and its policy have led to much litigation and difference of opinion. No doubt it was advisable to make written instruments and evidence compulsory for wills, guarantees, leases, and conveyances of land. It is questionable whether it was politic, having regard to mercantile usages, to include sales of goods within the purview of such a statute.

**Frauenburg** (Pol. Frombork). City and port on the Baltic. It stands on the Frisches Haff (Zalew Wislany) 42 m. by rly. S.W. of Kaliningrad (Königsberg). Heavily bombed by the Red Air Force in March, 1945, Frauenburg was overrun by Soviet troops in that month. It lies in the part of the former prov. of E. Prussia incorporated in Poland in 1946 as the voivodship of Masuria (later Olsztyn). Its interest lay in the Gothic cathedral and its associations. This, the cathedral of the bishops of Ermeland, was built in the 14th century, and had a fine W. front. Copernicus was a canon here when he died in 1543.

**Frauenfeld.** Town of Switzerland, capital of the canton of Thurgau. It stands on an eminence overlooking the river Murg, near its confluence with the Thur, 26 m. by rly. N.E. of Zürich. Its old castle has a 10th century keep, and its parish church dates from the 13th century. A prosperous town, it has iron industries, and manufactures of machinery, leather, and cotton fabrics, besides a thriving trade in farm products. During 1712–98 the diet of the Thirteen Cantons, the virtual government of the old Swiss Confederation, met at Frauenfeld. The inhabitants are German-speaking. Pop. 8,795.

**Frauenlob.** Nickname by which Heinrich von Meissen (c. 1250–1318), German poet, came to be known. He is sometimes described as a Minnesinger, and also as the founder of the Meistersingers at Mainz. He died at Mainz, and was carried to the grave by women of that city. He is supposed to have been called Frauenlob (praise of women) from his using the word *Frau* for woman rather than *Weib*.

**Fraunhofer, JOSEPH VON** (1787–1826). German optician and physicist. Born at Straubing in Bavaria,

the son of a glazier, he was apprenticed to a glass polisher, and eventually set up for himself as a maker and polisher of achromatic lenses. While working at this craft, at which he attained great skill, he taught himself mathematics and optics. In 1806 Fraunhofer was appointed optician in the mathematical institute at Munich, and in 1818 became the manager of another such institute, which he had helped to found. He died there, June 7, 1826.

Fraunhofer was responsible for great advances in the manufacture of lenses for telescopes and microscopes, while at the same time by his invention of the diffraction grating he opened up a new and fertile field of development for theoretical optics. But the discovery that has immortalised his name was that of the Fraunhofer lines. These lines had previously been noted by the English physicist Wollaston; Fraunhofer not only discovered them independently, but studied them deeply, publishing a map of 576 and assigning to the seven most prominent lines the letters A to G, by which they are still known. He also mapped the lines which he found in the spectra of several of the fixed stars, and from the fact that in no two cases were the lines exactly the same, he concluded that they must correspond to some definite property of the sun or star, and that they were not due merely to the effect of the earth's atmosphere. Fraunhofer thus became the founder of the science of spectroscopy (*q.v.*).

**Fraunhofer Lines.** Lines discovered by Fraunhofer. When a beam of sunlight that has been admitted through a thin slit is passed through a prism, so as to be drawn out into a spectrum, and this spectrum is examined through a telescope, it is found to be crossed by a multitude of dark lines. Careful investigation has revealed the existence of some 20,000 lines in place of the 576 originally counted. The position of each line corresponds to a definite angle of refraction of the light, and thus to a definite wavelength, and the presence of any given dark line implies that light of that wavelength has failed to reach us. The reason for this failure is the absorption of a particular wavelength by some element in the sun's atmosphere or in that of the earth.

It was established by Kirchhoff that the characteristic wavelengths of light which an element gives out when heated to incan-

descent are just those which it absorbs when cooler. For example, the flame of burning sodium examined through a spectroscope shows a bright double line, which corresponds in position to the dark double line in the solar spectrum known as the "D" line. The presence of the "D" line in the solar spectrum thus indicates the existence of sodium vapour in the sun's atmosphere. See Spectroscopy.

**Fraustadt** (Polish, Wszowa). Town of Silesia. It is 14 m. N.E. of Glogau (Glogow), in the part of Germany placed under Polish administration by the Potsdam conference, 1945. In a mining district, it is also a centre for sugar refining, tanning, dyeing, and flour milling.

In the vicinity of Fraustadt, King Augustus of Poland was defeated by Charles XII of Sweden, Feb. 13, 1706.

**Fray Bentos.** River port of Uruguay and capital of the dept. of Rio Negro. It stands on the Uruguay river, on the frontier with Argentina, 250 m. N.W. of Montevideo. It is a pleasant modern town, laid out in 1850, with wide thoroughfares and fine public buildings and abattoirs. In the centre of a stock-raising district it has a large export trade in extract of meat and animal products, and contains the chief factory of the Liebig Extract of Meat Co. Pop. 18,000.

**Frazer** OR GREAT SANDY. Island off the E. coast of Queensland, Australia. It lies between Hervey and Wide bays, is barren, but has excellent fishing.

**Frazer, SIR JAMES GEORGE** (1854-1941). A Scottish anthropologist. Born at Glasgow, Jan. 1,



Sir James Frazer, Scottish anthropologist

1854, he was educated at the university there, and at Trinity College, Cambridge. He became a barrister, but with the publication of his work on Totemism, 1887, abandoned a legal career. Three years later the first volume of *The Golden Bough* appeared; the third edition in 11 vols. was published in 1911, and an abridged vol. in 1922. This great work formed the most monumental study in comparative religion, mythology, and folklore yet published. In 1898 Frazer published his translation of Pausanias; he

edited Addison's Essays, 1915. His collected works numbered some 280, the best known including *Studies in the History of Oriental Religion*, 1906, and *Folklore in the Old Testament*, 1918. Professor of social anthropology at Liverpool university, 1907-19, he was knighted in 1914 and in 1925 received the O.M. Probably no other writer so influenced the attitude of his generation towards the supernatural and religious ritual. Frazer died May 7, 1941, leaving his notebooks to the British Museum. His wife (d. 1941), a Frenchwoman, *née* Lilly Grove, translated several vols. of *The Golden Bough* into French.

**Freckles.** Rounded or irregular spots of yellowish or brownish pigment in the deeper layers of the epidermis, most common in fair and red-haired persons. Freckles are permanent in some people, but in many they appear in the summer months, following exposure to sun, and disappear in the winter. Those desirous of avoiding the condition should wear veils in strong sunshine, and the skin should be protected by a foundation cream and a thick layer of powder. Freckles can be removed or lessened by application of a dilute solution of perchloride of mercury, or by hydrogen peroxide, but this should be done only under medical supervision.

**Fredegonde** OR FREDEGUNDE (d. 597). Frankish queen. Of humble birth, she attracted the attention of Chilperic I of Neustria, who murdered his wife, probably at her instigation, in order to marry her. A forceful character, she dominated her husband, had his sons murdered in order to make a future for her own boy, and carried on a relentless feud with Brunhild, queen of Austrasia. In 584 Chilperic died, murdered probably by his faithless wife, who became the ruler of Neustria in the name of her younger son, Clothaire II. By wars she had added something to its area when she died in 597.

**Fredericia.** Seaport of Denmark in the S.E. of Jutland. It stands on the Little Belt, at its N.W. entrance, 14 m. N.E. of Kolding, and is connected with that town and Esbjerg by rly., and with Middelfart in Fyen (Fünen) by steam

ferry. It manufactures cotton goods, hats, tobacco, and chicory, and exports eggs, meat, and fish. Founded in 1652 by Frederick III, Fredericia was destroyed by the Swedes in 1657; refortified in 1709, it was besieged in 1848-49 and 1864, when it was again partly destroyed. A statue commemorates the Danish victory over the Slesvig-Holstein army in 1849. Pop. 19,389.

**Frederick.** Christian name of Teutonic origin. It means rich in peace, and Friedrich (dim. Fritz), the German form, has been long a favourite name in Germany, borne by many rulers. From Germany it passed into England in the time of the Georges, although similar names, formed from the Anglo-Saxon *frith*, peace, had been in use in early times, e.g. Frideswide. The Italian form is Federigo.

**Frederick I** (c. 1124-90). German king and Roman emperor, known from the redness of his beard as Barbarossa. Son of the duke of Swabia, nephew of the German king Conrad III, and a member of the family of Hohenstaufen, Frederick became duke of Swabia in 1147, and was chosen king on his uncle's death in 1152. Three years later he was crowned emperor by the pope at Rome. His empire included Germany and parts of Italy; the kings of Poland, Bohemia, and Hungary at one time or another recognized him as their superior; and by his marriage he added Franche Comté to the lands inherited from his father and uncle. In Germany Frederick showed himself a strong and able ruler. He

would tolerate no rival to his own power, and easily crushed the rebellions engineered by turbulent princes. The duke of Bavaria was humiliated, and so, in 1181, was the powerful duke of Saxony, Henry the Lion, his duchy being broken up and he himself sent into exile. A little later the pope instigated some of the German prelates to rebel, but again the emperor was too strong for them.

The eventful years of Frederick's life, however, were spent in Italy, where he came into conflict with the rich cities of Lombardy. In 1158 began his long quarrel with Pope Alexander III. In 1160 the emperor was excommunicated,



Frederick I, German king, from a relief at Reichenhall, Bavaria

but he set up one anti-pope after another, and once entered Rome with an army and secured the coronation of his nominee. This success, however, was transitory, and soon his army was destroyed and he himself became a fugitive. To cow the cities he placed his own officials therein, and in 1162 stormed and humiliated Milan, but a few years later came the central disaster of his reign. The cities formed against him the Lombard League, an association blessed by the pope, and on May 29, 1176, the rival armies met at Legnano.

Frederick was totally defeated and fled from the field, after which no alternative was left to him but to sue for peace. A truce with the league became permanent a few years later, and in 1177 he signed the treaty of Venice with Alexander III. He had various disputes with Alexander's successors, but his power in Italy was never the same again. In 1189 he set out on a crusade, and on June 10, 1190, was accidentally drowned in a river in Cilicia.

Frederick was a commanding personality with marked ability and generous instincts, fearless, just, and devout, and his memory was long cherished by the Germans. But his reign was unfortunate for the Empire, and his costly campaigns in Italy did much to reduce it to impotence. *See* Empire; Papacy.

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**Frederick II** (1194–1250). German king and Roman emperor. Son of the emperor Henry VI and grandson of Frederick I, Frederick was born in Italy, Dec. 26, 1194, heir to the splendid Hohenstaufen inheritance and to that of his mother, Constance, the heiress of Sicily. Educated with more than usual care, his varied abilities earned for him the designation of *stupor mundi*, the wonder of the world. In 1196 he was chosen German king, and when his father died two years later he became king of Sicily and a ward of Pope Innocent III.

In 1212, following an invitation from some of the princes, Frederick left Italy to supplant Otto IV in Germany, and was there crowned king by his partisans. After six years the old struggle between Welf and Hohenstaufen ended in his favour with Otto's death in 1218. In 1220 he was crowned emperor at Rome, and after spending some years in governing Sicily and fighting in Italy he tardily fulfilled his promise to go on crusade. In 1228 he reached the Holy Land, and, having already taken the title of king of Jerusalem was crowned there as

soon as he had obtained possession of the city and its neighbourhood. Returning to Europe, Frederick



Frederick II. The emperor's seal as king of Jerusalem

was faced again with the hostility of the pope. Beginning soon after 1214, this was due chiefly to the emperor's evident intention of uniting Sicily and Germany, a course strongly resented by the papal court. Frederick was strong enough to force the peace of San Germano on Gregory IX in 1230, after which he brought Sicily completely under his personal rule. In Germany he pursued a contrary policy, for there, by the privilege of Worms, 1231, he gave the princes a charter of independence.

The concluding years of Frederick's reign were sad and unfortunate, not unlike those of Henry II of England. In 1231, and again somewhat later, his eldest son Henry had revolted; these risings were easily suppressed, and his second son, Conrad, was named as his successor. About 1239, however, began his last and greatest quarrel with the papacy. Excommunication he faced with a smile of contempt, but it was more serious when the pope allied himself with the Lombards and worked upon the turbulent princes of Germany. War broke out both in Germany and Italy. In the former anti-kings were found and crowned; in the latter the emperor's troops were utterly routed at Parma in 1248. Struggling to the last against a ring of foes, Frederick died at Fiorentino, Dec. 13, 1250. His splendid tomb is in the cathedral at Palermo.

Frederick was thrice married. His second wife was Yolande, the heiress of Jerusalem, and his third was Isabella, a daughter of John of England. Besides his lawful children, he had several illegitimate ones, notably Enzo, king of Sardinia, and Manfred. The emperor, who wore six crowns, made a great impression on his age: his court in Sicily was an intellectual

centre; in religious affairs he was tolerant, and in most other matters also in advance of his age. *Consult* History of Frederick II, T. L. Kingston-Oliphant, 1862; *Stupor Mundi*, Life and Times, L. Allshorn, 1912; Frederick II, E. Kantorowicz, 1931.

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**Frederick III** (1415–93). German king and Roman emperor. A Hapsburg prince, b. Sept. 21, 1415, Frederick was chosen German king in 1440, and was nominal ruler of the country for over 50 years. He was lethargic and indifferent, and under him the Empire lost what power and prestige it had retained. His feeble attempts to secure the kingdom of Hungary and Bohemia failed, and he was for a time deprived of Austria, and was unable to check the Turkish inroads. For some time before his death, on Aug. 19, 1493, he had ceased to take any part in the government of the country, which he left to his son Maximilian I, he himself being immersed in study and contemplation of the future greatness of his family. Frederick was the last emperor to be crowned in Rome, 1452.

Another and earlier German king is sometimes called Frederick III. A son of King Albert I, he was a Hapsburg. In 1314 a minority of the electors chose him as German king, and at once he was involved in war with the other king, Louis of Bavaria. He was defeated and taken prisoner, being released on acknowledging his rival. On this account he is not usually reckoned in the succession of German kings. He died Jan. 13, 1330. *See* Louis IV.

**Frederick** (1831–88). German emperor. Son of the emperor William I, he was born at Potsdam, Oct. 18, 1831.

After studying at Bonn he travelled, and in 1855 was betrothed to Victoria, princess royal of England, whom he married in 1858. In politics he strongly opposed Bismarck. In the Austrian war, 1866, he commanded an army at Sadowa. In command of an army in the war of 1870, he fought at Wörth and Sedan, and took part in the siege of Paris.

Frederick was a strong advocate for the establishment of the German Empire, though his ideals differed considerably from those of Bismarck. The Liberal party hoped great things when he came to the throne, but he was attacked by cancer of the throat, and was obliged to go to Nice in 1887. On



Frederick, German emperor

the death of his father in March, 1888, he succeeded to the throne, which he had occupied for only ninety-nine days when he died at Potsdam, June 15, 1888. He was succeeded by his son William II. His family consisted of two sons, William II and Henry of Prussia; and four daughters, Charlotte, wife of Albert, duke of Saxe-Meiningen; Victoria, wife of Adolf, prince of Schaumburg-Lippe; Sophia, wife of Constantine, king of Greece; and Margaret, wife of Prince Frederick Charles of Hesse. He is sometimes referred to as Frederick III because he is the third Frederick among the Prussian kings. *Consult* Life of Emperor Frederick, S. Whitman, 1901; The Empress Frederick, R. Barkeley, 1956; The English Empress, Egon Caesar Conte Corte, Eng. trans., 1957.

**Frederick.** Name of nine kings of Denmark. The more important are noticed separately below.

**Frederick III** (1609-70). King of Denmark and Norway. Second son of Christian IV, he succeeded his father in 1648, having previously been bishop of Bremen and Verden. In war with Sweden, 1657-60, Denmark lost many islands and her territory on the Swedish part of the peninsula. In 1660 the people granted him absolute powers and made the monarchy hereditary instead of elective. He died in Copenhagen, Feb. 6, 1670.

**Frederick IV** (1671-1730). King of Denmark. Son of Christian V, he succeeded his father in 1699. His reign was marked by successive wars against Sweden, but he was forced to sign peace when Charles XII besieged Copenhagen, 1700. In 1709 he again went to war, capturing Stralsund and Tönningen. By the Peace of Copenhagen, 1720, he had to surrender his gains for a money payment, and his last years were spent in the work of carrying out many much needed internal reforms.

**Frederick VI** (1768-1839). King of Denmark and Norway. Son of the insane Christian VII, he acted as regent from 1784, and became king in 1808. His part in the maritime confederation of Denmark, Russia, and Sweden led to the destruction of his fleet by Nelson at the battle of the Baltic, 1801. His unsatisfactory attitude towards Napoleon caused the bombardment of Copenhagen and capture of the Danish fleet in 1807. His alliance with Napoleon brought about the loss of Norway in 1814. Denmark became bankrupt and did not recover for some years. Himself not free from the taint

of insanity, Frederick had capable ministers, and his reign was marked by political and legal reforms.

**Frederick VII** (1808-63). King of Denmark. Son of Christian VIII, he succeeded his father in 1848.



Frederick VII,  
King of Denmark

He promulgated the constitution designed by his father, and restored parliamentary government, but his tyrannical treatment of Slesvig-Holstein led to the revolt of that duchy in 1848. Frederick was the last king of the Oldenburg dynasty. He died Nov. 15, 1863.

**Frederick VIII** (1843-1912). King of Denmark. Son of Christian IX, he was educated at a Danish grammar school, and at Oxford. He took part in the war against Prussia and Austria over Slesvig-Holstein, 1864. In 1869 he married Louisa, daughter of Charles XV of Sweden. He succeeded his father in 1906 and died suddenly at Hamburg, May 14, 1912. In 1905 his second son became king of Norway as Haakon VII.

**Frederick IX** (b. 1899). King of Denmark. Son of Christian X, he was born March 11, 1899. On May 24, 1935, he married Princess Ingrid of Sweden. He succeeded his father as king April 20, 1947.

## FREDERICK THE GREAT OF PRUSSIA

Major G. W. Redway, Author of *The War of Secession*

*With this article may be read those on Prussia; France; Germany; those on Frederick's battles, e.g. Leuthen, Prague, Rossbach, and those on his contemporaries, e.g. Catherine of Russia, the Emperor Joseph II, and Voltaire. See also Europe; Seven Years' War*

Born at Berlin, Jan. 24, 1712, Frederick II of Prussia, known as Frederick the Great, was the son of Frederick William I. As a boy he did not share his father's military proclivities, and broke away from the parades of a cadet company of young noblemen which had been established for him to drill, in order to study music and philosophy.

He was to have married the Princess Amelia of England, but the influence of Austria prevailed with his father, who mated him in 1733 with Elizabeth, princess of Brunswick-Wolfenbüttel. Meanwhile, Frederick, harassed at home by his royal father, who at table would spit in the dish to prevent his children from eating their fill, and once attempted to strangle Frederick for refusing to resign his rights to the succession, ran away from court. He hoped to escape

**Frederick I** (1657-1713). King of Prussia. The son of Frederick William, elector of Brandenburg

and through his mother related to the Orange family, he was born at Königsberg, July 11, 1657. His father married again, and there was some jealousy between Frederick and his stepmother and her offspring; the affair led to the voluntary exile of the young prince, while his father bequeathed parts of his lands to his younger sons. In 1688 Frederick became elector, and by a judicious use of money he persuaded his half-brothers to give up their shares, thus securing the whole of the electorate.



Frederick I,  
King of Prussia

The central incident of the reign was the elector's elevation to the rank of king. Taking advantage of the emperor's military needs, he won from him this grant, and on Jan. 18, 1701, he crowned himself king of Prussia at Königsberg. His troops fought for several years against France, and this and other reasons threw the finances of the country into disorder. He died Feb. 25, 1713, leaving an only son, Frederick William I, who was the father of Frederick the Great. The second of his three wives was Sophia Charlotte, sister of George I.

to Paris, but was caught, tried by court-martial, and sentenced to death. His companion Katte was actually beheaded, Frederick fainting at the sight.

The year after his marriage Frederick joined Prince Eugene in his last campaign on the Rhine. Then he entered into correspondence with Voltaire, and wrote the *Anti-Machiavel*, in which he set forth the duties of a sovereign as "the first servant of his people." He had become reconciled to his father, after whose death—May 31, 1740—he ascended the throne. In the same year the emperor Charles VI was succeeded by his daughter Maria Theresa, who declined to recognize Frederick's claim to Silesia, arising out of political bargains made by his great grandfather, Frederick William, called the "Great Elector."

The new king of Prussia at once went to war. Marching up the Oder, he took Breslau in December, placed his army in winter quarters, and in the spring of 1741 met the Austrians near Brieg. At the battle of Mollwitz (April 10, 1741) the Austrian cavalry drove the Prussian horse off the field, and the king took flight with them; but Marshal Schwerin had 60 guns and solid infantry with a superior musket, and at sundown the Austrian general, Neipperg, ordered a retreat southwards to Niesse. Frederick was thus left in possession of Silesia. Meanwhile, France, Bavaria, and Saxony had sided with Frederick, and their armies joined him in Moravia. The Austrian army, however, had not been disposed of, and on May 17, 1742, Prince Charles of Lorraine brought the Prussians to action at Chotusitz, S.W. of Königsgrätz. Frederick won the battle by a resolute advance with his right wing after his left had been defeated, and so initiated those enveloping movements that have characterised Prussian tactics.

Frederick now hoped to settle down to enjoy his possessions, his flute-playing and literary correspondence, and to improve his army. He rose at 4 a.m. and put on uniform and the high boots which he only discarded once a year—at his wife's court on her birthday. By 9 a.m. he had finished work with his secretaries, and then gave audience to aides-de-camp and private individuals. He dined at twelve, keeping cooks of different nations to prepare special dishes, and drinking champagne. Then he walked rapidly till 4, when he dealt with state and education matters, and at 6 held a concert. By 11 the king was abed.

Meanwhile, Austria, having drawn to her side England and Hanover, was making headway against France, but the Austrian successes were inimical to Prussia, and Frederick, in support of his ally, moved an army into Bohemia. Marching up the Elbe through Saxony, he captured Prague (Sept. 8, 1742), but was outmanoeuvred by Prince Charles and Marshal Traun, and compelled to retreat into Silesia. But on June 4, 1745, at Hohenfriedberg, he attacked the Austrians under Prince Charles, and threw them back into the Riesengebirge. On Sept. 30 Frederick met Prince Charles again at Soor on the Elbe, and again drove the Austrians westward. In Dec. he concerted the measures by which Prince Leopold beat the Austro-Saxons at Kesselsdorf, and then Frederick entered the Saxon

capital, where a treaty was signed on Christmas Day, 1745, by which Austria resigned all claim on Silesia. But in the autumn of 1756 Frederick was compelled to draw the sword against a coalition of all the continental powers, and begin the contest known as the Seven Years' War.

The state of Prussia at the close of the struggle in 1763 has been painted by Macaulay in his well-



*Frederick*  
After O. Vanloo

known essay on Frederick the Great. The king set about the work of reconstruction with his accustomed vigour. He was now fifty, but was to reign for another 23 years as a benevolent despot. No department of church or state was immune from his interference. He would clap a judge into jail, or appoint a cardinal for his Roman Catholic subjects, or keep a general in arrest for weeks. He set up loan offices, built an opera-house, and put his artillery horses to the plough, in the intervals of instructing ambassadors and publishing poetry. History has condemned him for his share in the partition of Poland in 1772, but in fact all but one-seventeenth part of that desolated country went to his two neighbours, and for years Poland had been virtually a province of Russia.

In 1779 Frederick took the field for the last time, for Austria was now ruled by Joseph I, who was bent on reviving the old claim to Silesia. Frederick and his brother Henry attempted an invasion of Bohemia, but the Austrians under Loudon and Lacy had entrenched 50 m. of country so that the two Prussian armies could not unite. The campaign came thus to an inglorious end through the mediation of Catherine of Russia.

Frederick attended manoeuvres in 1785, and caught a chill from which he never recovered. He died childless at his palace of Sanssouci, Aug. 17, 1786, and was succeeded by his nephew, Frederick William II.

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**Frederick.** Name of five electors palatine of the Rhine. They belonged to the family of Wittelsbach (*q.v.*). Frederick I ruled from 1451 to 1476; Frederick II, called the Wise, ruled from 1514 to 1556, having before his accession been prominent in German affairs; Frederick III, elector from 1559 to 1576, made Calvinism the dominant faith in his electorate; Frederick IV ruled from 1583 to 1610.

**Frederick V** (1596-1632). Elector palatine of the Rhine and nominal king of Bohemia. A son of the elector Frederick IV, and grandson of William the Silent, Frederick became elector in 1610 and married, 1613, Elizabeth, daughter of James I of Scotland. By descent Frederick was a leader among the Protestants, and as their nominee was chosen king of Bohemia, Nov. 4, 1619. His rival, the emperor Ferdinand II, was, however, too strong, and the first stage of the Thirty Years' War was marked by Frederick's defeat near Prague, Nov. 8, 1620.

He was driven from Bohemia, the Palatinate was taken from him, and he was deprived of his position as an elector. From 1623 until his death, Nov. 29, 1632, Frederick remained an exile. He was the father of Sophia, electress of Hanover, and of the cavalier, Prince Rupert. On account of his short stay in Bohemia he is often called the Winter King.

**Frederick I** (1309-1428). Elector of Saxony. About 1388, when he succeeded to some part of the family lands in central Germany, Frederick began to take a leading part in the affairs of the country,



and assisted the Emperor Sigismund against the Hussites. For these services he received, in 1423, the duchy of Saxe-Wittenberg, the modern Saxony, and the attached dignity of an elector, a connexion of great importance both for Saxony and for Frederick's descendants. He died Jan. 4, 1428, his successor being his son, Frederick II, a comparatively unimportant person, who reigned from 1428 until his death, Sept. 7, 1464.

**Frederick III** (1463-1525) Elector of Saxony, known as the Wise. Beginning his reign in 1486, Frederick soon became prominent in German politics, and might have succeeded Maximilian I as emperor in 1519 had he so desired. He was anxious to improve the methods of governing Germany, but is best known for his friendship with Luther, whom he appointed to a chair in his own university at Wittenberg. After Luther's memorable defiance of the Church, the elector protected him from his enemies. Frederick died May 5, 1525.

**Frederick** (1707-51). Prince of Wales. The eldest son of George II, he was born Jan. 6, 1707, his father being then crown prince of Hanover. From 1714, when his grandfather became king as George I, until in 1729 he was made prince of Wales, he was called duke of Gloucester. Frederick is important only as the centre of the opposition to George II, and as the father of George III. He and his father were constantly at variance on financial and other matters, and in 1737 the prince was banished from court. He replied by setting up a court of his own at Norfolk House, St. James's Square, and this became the resort of all who were opposed to George II and Sir Robert Walpole. He died March 20, 1751. In addition to George III he left four sons and two daughters by his wife, Augusta, daughter of Frederick, duke of Saxe-Gotha, who lived until 1772. The sons were Edward, duke of York (1739-67), William, duke of Gloucester (1743-1805), Henry, duke of Cumberland (1745-90), and Frederick (1750-65). *Consult* Memoirs of the Reign of George II, H. Walpole, 1847; Frederick Louis, Prince of Wales, A. Edwards, 1947.



Frederick,  
Prince of Wales

**Frederick Augustus I** (1750-1827). First king of Saxony. Son of the elector Frederick Christian, he was born at Dresden, Dec. 23,

1750. In 1763 he became elector, and in 1769 began personally to rule. His early years were marked



Frederick Augustus I,  
King of Saxony

by a wise and just conduct of affairs, leading to a prosperity which was interrupted by the French Revolution. He had gained something by a short war against Austria in 1778, but he kept neutral on other occasions until in 1793, as a German prince, he joined in the war on France. He was out of it from 1796 to 1806, when, after Prussia's defeat at Jena, he made peace with Napoleon, and in 1806 he took the title of king.

As an ally of Napoleon, his Saxons were in arms from then until the end, for which action a high price was paid. The king was present at the battle of Dresden, and after Leipzig his capital and kingdom were in the power of the allies and he himself their prisoner. The congress of Vienna took from him a large part of Saxony, about 7,800 sq. m., but he kept the title of king. Until his death, May 5, 1827, he did his best to help his people to recover from the ravages of war.

**Frederick Charles** (1828-85). German soldier, known as the Red Prince. A son of Prince Charles of Prussia and a grandson of Frederick William III, he was therefore a nephew of the emperor William I. Born March 20, 1828, he was trained from a child for the army, both at Bonn and with his regiment. He served Prussia against the Danes in 1848, and was with the Prussian force that invaded Baden in 1849, being there wounded. In 1864 he led a corps into Denmark and was in supreme command during the later stage of the struggle against the Danes.

A scientific soldier and keen on his profession, the prince was closely associated with Moltke and his work. He rose from one command to another, and from 1860 to 1870 he was at the head of the iron corps of Brandenburg, which attained under him its later reputation. In 1866 he was chosen to command an army in the war against Austria, and was largely responsible for the Prussian victory at Sadowa. In 1870 he was



Frederick Charles,  
German soldier

put in charge of one of the three armies that marched into France. He had a considerable share in bringing about the surrender of Bazaine and the fall of Metz, after which he conducted the operations against the French on the Loire, his great success here being at Le Mans. Made field-marshal in 1870, his last post was that of inspector of cavalry. He died June 15, 1885.

The prince was a soldier of great energy, sparing neither himself nor his men in his efforts to improve the condition of the Prussian army. He appears to have been somewhat difficult to work with and his relations with his royal kinsfolk were not always harmonious. He married a princess of Anhalt, and one of his daughters became the duchess of Connaught. He owed his nickname to the colour of the uniform he habitually wore.

**Frederick William** (1620-1688). Elector of Brandenburg, known as the Great Elector. Born in Berlin, Feb. 16, 1620, the son of the elector George William, he passed much of his youth in the Netherlands, a stay that was responsible for his marriage with Louise, a princess of Orange, 1646. In 1640 he became elector, and his first duty was to free Brandenburg from the horrors of the Thirty Years' War. He did this, and from the peace of 1648 to his death he saw his land growing in prosperity.

He organized the army, founded the navy, welcomed industrious immigrants, started colonies in Africa, and encouraged trade. He had great influence in European affairs, and helped William of Orange's invasion of England in 1688. He added to his land both east and west. The peace of 1648 gave him part of Pomerania, Prussia was firmly joined to Brandenburg and Cleves, and Jülich was secured. He died at Potsdam, May 9, 1688, and was succeeded by his son Frederick, 1st king of Prussia.

Frederick William was the real founder of Prussia, for which his reign, autocratic though it was, was wholly beneficial. He was a Protestant and a supporter of the Empire, but neither sympathy stood in the way of his main ambitions. *See* Fehrbellin, *consult* Origins of the Kingdom of Prussia, A. W. Ward, 1908 (Camb. Modern History); Life, C. E. Maurice, 1926.



Frederick William,  
Elector of Brandenburg



**Frederick William I** (1688-1740). King of Prussia. Born Aug. 15, 1688, he was a son of Frederick



Frederick William I,  
King of Prussia

I, and related through his mother to George I of Great Britain. In Feb., 1713, after a somewhat strict upbringing, he became king of Prussia. In the name of economy, he was continually cutting down expenses, although he spent much on the celebrated collection of giants for his army, which he raised to a high state of efficiency.

Frederick was a successful ruler, and greatly improved the condition of Prussia. He provided a more efficient administration; and with an increased revenue old debts were paid off. Trade was encouraged by restricting manufactured imports, and by other methods in harmony with current theories, while E. Prussia was peopled with industrious settlers. He secured Pomerania from Sweden, and was concerned in the various European alliances of the period. He founded a number of schools and, in a somewhat orthodox way, was a friend of learning. He died May 31, 1740. His wife was a princess of Hanover, and his son was Frederick the Great, and, although the king was by no means a wise parent, the wealth and the army that he left laid the foundations of his son's successes. See History of Prussia, H. Tuttle, 1884.

**Frederick William II** (1744-97). King of Prussia. Born in Berlin, Sept. 25, 1744, he was a grandson of Frederick William I, and a nephew of Frederick the Great. In 1757 his father, Prince Augustus William, died, and for the next 29 years he was the heir to the Prussian throne. Well educated, he passed this period occupied with his pleasures, chiefly music, troubling little about affairs of state. In Aug., 1786, he became king. In external affairs, Prussia was engaged in watching the progress of the revolution in France, and from 1792-95 in fighting against that country, not, however, with any great determination. A share of Poland was acquired, and there was a campaign against Holland. But in these matters the king was not the leading spirit, nor even the head of the army.

Before his accession he had become a Rosicrucian, and it was a member of this curious fraternity, Johann Christof Wöllner, who

really ruled Prussia, his chief assistant being another Rosicrucian, Johann Rudolf Bischoffswerder. These men spared no efforts to crush liberty of thought, ostensibly in the interest of the Christian faith, and in so doing they counteracted the popularity gained when the king ordered the abandonment of some of the French ideas introduced by Frederick the Great. Frederick William, who died Nov. 16, 1797, was twice married, and had several mistresses. Consult A Mystic on the Prussian Throne. G. Stanhope, 1912.

**Frederick William III** (1770-1840). King of Prussia. Born Aug. 3, 1770, he was the eldest son of Frederick William II by his second wife, a princess of Hesse-Darmstadt. He was well educated and had served in the field when he became king in 1797. He suffered the humiliation of Jena and of the surrender of much of Prussia to Napoleon. But in 1812 he called upon his people to rise, and saw the victories and enthusiasms of the war of liberation. He took part in the European conferences of 1815 and after, but, as a rule, merely as an echo of the tsar Alexander I.



Frederick William III,  
King of Prussia

At home he showed a dislike for the current liberal movements, but died before Prussia had been seriously disturbed by them. He did something, however, to improve the administration of his lands, especially those acquired in 1815. He died June 7, 1840. His wife was Louise, a princess of Mecklenburg-Strelitz, and it was she who, more than the king himself, helped the ministers to free the country from the misfortunes of 1807. She died in June, 1810.

**Frederick William IV** (1795-1861). King of Prussia. The eldest son of Frederick William III, he was born Oct. 15, 1795. He saw a little military service in 1814, but his main interest was in arts and culture generally. He had been well and carefully educated, and showed a real liking for the society of scholars. In 1840 Frederick came to the throne. Although he had some



Frederick William IV.  
King of Prussia  
After J. O. Otto

sympathy with the liberal movements of the age, he was a strong believer in maintaining the old order, including the divine right of his own position. He showed sense in acting with much more toleration than his father.

In 1848, during the rising in Berlin, Frederick William appeared, with some loss of dignity, as an enthusiast in the popular cause, but this was a passing phase. He refused, probably wisely, the new crown offered to him by the German princes, and the union was delayed until 1871. Next followed a return to the policy of hostility to Austria, but when this meant war he drew back, preferring rather to give way in the convention of Olmütz. Later he carried forward a little the plan of constitutional reform in Prussia and was concerned in the international matters of his time. In 1857 the king's mind became deranged, and until his death, Jan. 2, 1861, his brother acted as regent.

**Frederick William** (1882-1951). German prince. The eldest son of William II, he was born May 6,

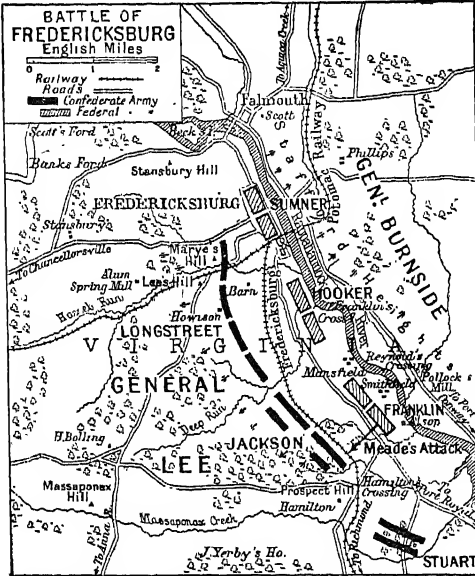


Frederick William,  
former German  
Crown Prince

1882. On his father's accession, 1888, he became crown prince. He was nominally in command of a group of armies on the western front during the First Great War. In 1918 he associated himself with his father's abdication and took refuge in the Netherlands. He married in 1903 Cecile, duchess of Mecklenburg. He published his memoirs in 1922, and in 1923 retired to his estate in Silesia. Though a keen National-Socialist, he took no active part in the Second Great War, and afterwards lived in the Hohenzollern castle near Sigmaringen in the French zone, where he died July 20, 1951.

**Fredericksburg.** City of Virginia, U.S.A., in Spottsylvania co. On the Rappahannock river, 60 m. N. of Richmond, it is served by rly. A city of many historical associations with the Revolutionary and Civil Wars, it is the site of one of the homes of the Washington family, which still stands; Mary Washington college; and a national memorial park honouring those who fell in the Civil War battle fought here (v.i.). Among its products are paper goods, egg crates, railway ties, shoes, and





Fredericksburg. Map showing the disposition of forces in the American battle of Dec. 11-15, 1862

clothing. Captain John Smith landed here in 1608 and negotiated with Indians. Settled in 1671, the town was incorporated in 1727. Pop. (1950) 12,158.

**Fredericksburg, BATTLE OF.** Fought in the American Civil War, Dec. 11-15, 1862, between the Federals under Burnside and the Confederates under Lee. It took place on the S. bank of the Rappahannock, near Fredericksburg. The object of the Federals, who were on the N. bank of the river, was to cross and gain the road to Richmond, the Confederate capital, but the Confederates barred the way. The Federals numbered 125,596 against the Confederates 85,175, an insufficient majority for attack; moreover, the Confederates had a better supply of officers.

General Lee's army was organized in two corps under Longstreet (1st) and Jackson (2nd) respectively, and a cavalry division under Stuart. Burnside had formed his army in three grand divisions under Sumner (right), Hooker (centre), and Franklin (left). A bend of the river enabled the Federals to bring under the fire of their heavy guns on Stafford Heights a considerable part of the opposite bank, including the town of Fredericksburg, which caused the Confederates to withdraw to a range of low hills about 2 m. from the river, where Lee, on a front of 7 m. or 8 m., constructed defence works and emplaced his guns to sweep all the approaches. On the extreme right was Stuart's cavalry, in the centre Jackson's corps, and on the left Longstreet's.

him. For nearly a month the two armies had been face to face, and most careful preparations had been made on both sides, but since Lee could not be certain where the Rappahannock would be crossed, he kept Jackson's corps some 20 m. down the river until Dec. 12, when the enemy, having completed his pontoon bridges, crossed and seized the town, driving out the small Confederate garrison. On Dec. 13 the Federals were on the right bank. In the result Franklin's two corps assailed Jackson's corps and Stuart's cavalry, Sumner's two corps afterwards attacking Longstreet's corps, while Hooker's command assisted Franklin and Sumner in turn.

The left attack under Franklin employed two divisions, or seven brigades, against six Confederate brigades drawn from the divisions of A. P. Hill, Ewell, and Hood (Jackson's corps). The right attack W. of the town was delivered mainly by Couch's 2nd corps, and was crushed by four Confederate brigades from the divisions of Ransom and McLaws (Longstreet's corps). The attackers on this front, although reinforced by four brigades from Butterfield's 5th corps, failed to reach the Confederate defences. On the left Lee's defences were never in actual danger, for the attackers who escaped the fire of Longstreet's artillery were shot down at musket range.

On the right the encounter was less one-sided, for the Federals contrived to break through Jackson's line at "a point of woods" form-

ing a salient where the ground in rear had been deemed impenetrable through a deep ravine and thick undergrowth. This obstacle, however, was overcome by Meade's division, which got in rear of Lane's and Archer's brigades, and captured part of the supporting brigades under Gregg and Thomas. In military history this battle is remarkable as exhibiting the power of passive defence when time has been allowed for entrenching. It shows the natural results of a succession of vague orders and the lack of resolution, and the danger of frontal attacks was once again exemplified. It has been said that the defending general missed his opportunity for a decisive counter-attack, but according to Jackson, the Federal artillery completely dominated the plain over which the Confederates would have to advance towards the river. The Federals, therefore, were suffered to remain on the south bank for two days, under the fire of skirmishers.

The Federal generalissimo might have reinforced these six corps by postponing his attack, for Siegel's (11th) and Slocum's (12th) corps were on their way to join

ing a salient where the ground in rear had been deemed impenetrable through a deep ravine and thick undergrowth. This obstacle, however, was overcome by Meade's division, which got in rear of Lane's and Archer's brigades, and captured part of the supporting brigades under Gregg and Thomas.

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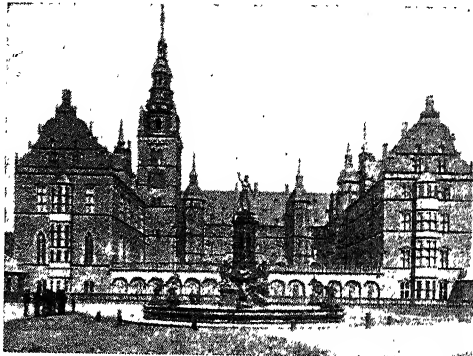
After the battle Lee's defences were strengthened and his troops redistributed to meet any further attack. But Burnside withdrew his forces (113,000 men) just when the arrangements had been made by the naval authorities to support him by a feint attack with gunboats at Port Royal; he recrossed the river on the night of Dec. 15. Thus Lee's army was left in peace for the winter, for the attempt known as the Mud March, a month later, to move round his left flank and cross the river above the town, collapsed. Violent quarrels ensued between Burnside and his subordinates, some of whom he dismissed; but in the end Burnside himself was relieved of his command. See American Civil War; Lee.

**Fredericton.** City and capital of New Brunswick, Canada. It stands on the river St. John, 84 m. from its mouth, and 65 m. N.N.W. of the city of St. John. It is a station on the C.P.R. and C.N.R., while steamships connect it with St. John. The chief buildings are those of the provincial legislature and the government offices, Government House, the city hall, the barracks, an Anglican cathedral, and a picture gallery; also the University of New Brunswick.

Fredericton is the centre of a lumbering and mining district and its industries include boat-building, tanning, and the making of boots and shoes. The city, first called St. Ann's, was founded about 1740, and, although not so large as St. John, was made the capital in 1788 because it was less exposed to attack. Pop. (1951) 16,018.

**Frederiksborg.** A residential suburb in the S.W. of Copenhagen. The royal palace, erected by Frederick IV, on a commanding eminence, is now utilised as a military college. There are a fine park, zoological gardens, museum, and picture gallery. It is the seat of the royal porcelain factory, and there are also extensive breweries.

**Frederiksborg.** Royal palace of Denmark. It is built on a group of small islands in a lake near Hillerød, in the district of Frederiksborg, in Zealand, 21 m. by rly. N.N.W. of Copenhagen, and has a fine park. Erected in the 17th century by Christian IV on the site of an older castle, it was restored and embellished after a fire in 1859, and now houses a national historical museum. Several Danish monarchs have been crowned in the chapel.



Frederiksborg, Denmark. Courtyard of the royal palace, as rebuilt after the fire of 1859

**Frederikshald** (formerly Halden). Seaport of Norway, in the fylke or co. of Östfold. It stands at the mouth of the Tistedal river, at its junction with the Ide Fjord, 58 m. direct and 85 m. by rly. S.S.E. of Oslo. Twice burnt, it has been rebuilt in modern style. A great timber depot, it also exports wood pulp, marble, granite, and fish. It has sugar refineries and tobacco and boot factories. The harbour is safe and commodious. The town, which was besieged by the Swedes for two years (1658-60), is defended by two fortresses, the famous Frederiksten, founded by Frederick III in 1661, and the Gyldeuløve, near which Charles XII of Sweden was killed by a musket ball while besieging the town in 1718. It was surrendered to Bernadotte in 1814.

**Frederikshavn.** Seaport of Denmark, on the N.E. coast of Jutland. It stands on the Kattegat, 23 m. by rly. E. of Hjørring, and its fine ice-free port, the second best port in Jutland, is a harbour of refuge. Its exports include butter, bacon, eggs, cattle, pigs, meat, and fish. It is connected by regular sailings with Sweden, Norway, and England. A mere fishing hamlet called Fladstrand in 1818, by 1958 it had a pop. of more than 15,000.

**Frederiksstad.** Seaport of Norway. It stands at the mouth of the Glommen river, in the fylke or

co. of Östfold, 58 m. by rly. S.E. of Oslo. A centre of the timber trade, it exports pit-props, planks, bricks, tiles, nails, and granite. There are shipbuilding yards and rly. and chemical works. The old town was built by Frederick II in 1570 and strongly fortified. Pop. (est.) 14,000.

**Free Association.** Term used in psychology for the result of relaxing and allowing one's thoughts to drift without any at-

tempt to control them. Such chains of thought begin sooner or later to express unconscious wishes, fears, etc., and their revelation to the psychiatrist without any reservation, is therefore the chief method used in psychiatry to obtain knowledge of the unconscious mind.

**Freebench.** Term used in English law. It was the dower to which a widow was entitled, by the custom of the manor, out of her deceased husband's copyholds. It was abolished in 1925.

**Freeboard.** That part of a vessel's side between the upper deck and the water-line or line of flotation.

**Free Church.** Self-descriptive term adopted towards the end of the 19th century by those religious communities in the U.K. previously known as a general group only as dissenters or nonconformists. The term, intended as an antonym to the term Established Church, came into general use with the establishment of the Free Church Council (*v.t.*), a federal body representing numerous denominations claiming freedom of choice in doctrine, church administration, form of worship, appointment of ministers, etc.

**Free Church Federal Council.** Central organization in England and Wales the object of which is to federate the various Free Churches.

It promotes united efforts in the evangelisation of the people, and strives to prevent overlapping. It originated shortly before 1892 in a Free Church Congress held in Manchester, and numerous congresses and annual gatherings have been held since. The council has been conspicuous in connexion with many religious and social movements. It has organized district councils or federations all over England and Wales and has employed evangelists to conduct missions throughout the country, amongst whom Gipsy Smith (*q.v.*) was notable. Delegates to its annual conference are chosen locally by the Free Churches. The moderator, a leading minister, is elected annually. The headquarters are at 27, Tavistock Sq., London, W.C.1. See Nonconformity.

**Free Church of England.** Title assumed at various times by congregations which have separated from the Church of England on doctrinal or other grounds. It is more especially applied to a small sect which originated about 1844 in Devon as a protest against the Oxford Movement. It has bishops, who derive their succession from G. D. Cummins, who seceded from the Protestant Episcopal Church in America in 1873. Its doctrines are ultra-Low Church, and it uses a slightly modified version of the Book of Common Prayer. In 1927 it united with the Reformed Episcopal Church.

**Free Church of Scotland.** Name adopted originally by those members of the Established Church of Scotland who severed themselves from that body in 1843. In the third decade of the 19th century a controversy arose in the Established Church of Scotland. The outstanding points at issue were patronage and liberty of individual congregations to reject ministers presented to livings. A Veto Act was passed in 1834 by the general assembly, satisfying the objectors on these two questions. The famous Auchterarder case, decided in the court of session, 1838, and confirmed by the house of lords, 1839, deprived congregations of their right to reject a presbyter. Controversy between the two parties then became acute.

The dissatisfied group, known as the non-intrusion party, meeting at the annual assembly in Edinburgh, May, 1843, decided to withdraw from the gathering and marched to Tantfield Hall at Canonmills. There they formed the first Free Church Assembly, electing the Rev. Thomas Chalmers (*q.v.*) as

moderator. This constituted what is termed the disruption. In the same month 396 ministers and professors signed an act of separation, renouncing all claims to the benefices held under the Established Church. The signatures ultimately numbered 474. This act of demission represented a voluntary surrender of an aggregate annual income of something like £100,000.

The new Free Church started a sustentation fund, erected new churches, and became a strong body, numerically, financially, and in foreign mission work. In 1900 it was amalgamated with the United Presbyterian Church in Scotland, and was thenceforward known as the United Free Church of Scotland. The present Free Church of Scotland consists of those members of the original Free Church who refused to unite with the U.P. Church 1900.

After the union of 1900 the Free Church made legal claim to the entire property of the original Free Church. This claim led to the famous ecclesiastical law case of *Bannatyne v. Overtoun*. It was argued in the court of session, when judgement was given in favour of the United Free Church. The small Free Church party then appealed to the house of lords, and judgement was given in their favour in 1904. A situation was thus created in which a handful of members were given all the property, churches, manse, colleges, and funds of the original Free Church. In 1905 an Act of Parliament altered this. A royal commission allocated the property between the two bodies, and generally regularised the position. The Free Church of Scotland is strongest in the Highlands, and has about 180 congregations, also a college with five professors of divinity; and missionaries in S. Africa, India, Canada, and S. America. See Presbyterianism; Scotland, Church of; United Free Church; United Presbyterian Church.

**Free City.** City that is independent of any save the highest authority. The free cities of the Middle Ages were under the rule of none save the emperor himself, being in practice little republics, each with its own form of government. A modern example was Danzig (*q.v.*), under the League of Nations 1920-1939.

The first free cities were towns standing on land ruled by the emperor, but their numbers were augmented when the privilege was found to be a valuable one. Some bought it, to others it was given;

while on the other hand some were deprived of it—an instance of this being Donauwörth in 1607. The free cities were represented in the imperial diet from about 1490, and, as constituted later, one of its colleges was composed of their representatives. They were divided into two groups, Rhenish and Swabian, and played a considerable part in the affairs of Germany. Some of them had forces, many had wealth, so their help was frequently sought by emperors and other rulers, especially in times of war. The hostility of the free cities was feared by the most powerful; their support kept kings on their thrones. Their number varied; in 1521 a list gave 84 of them, after which there was a decrease.

With the changes caused by the French Revolution many of the cities lost their freedom, and in 1803 six only were recognized. They were Hamburg, Lübeck, Bremen, Augsburg, Frankfurt, and Nuremberg. In 1806 Bavaria secured Augsburg and Nuremberg, but the other four lasted until 1866, when Frankfurt, having fought against Prussia, lost its independence. As free cities the other three entered the German empire in 1871 and remained therein after the changes of 1918. See Germany; History.

**Free Corps.** Fighting troops as distinct from the regular armed forces of a country. They can roughly be grouped in three categories: (a) units of, usually, volunteers, formed by individual leaders with the consent of their governments, for the duration of a war or another emergency; (b) units of similar nature but recruited and employed without consent of or even against the government involved; (c) irregulars, usually not uniformed bodies, waging guerrilla war behind the lines of an invading army.

Though the name of Free Corps was first used during the 18th century, probably referring to the freedom allowed to the leader for recruiting, or possibly to the lax discipline, the characteristics apply to many medieval soldiering bodies. The Austrians had Croats and Pandours; Frederick the Great when fighting against them had similar light forces, mostly of aliens; after Prussia's defeat by Napoleon, officers like Lützow and von der Tann fought him with Free Corps, all coming under category (a). In 1813 Prussia resorted to the improvisation of such forces. After the German defeat of 1918, Free Corps under von der Goltz, Ross-

bach, and others continued a war, mostly against the Bolsheviks, in the Baltic; while similar units under Denikin and others struggled in Russia.

Under the second heading fall the forces of the Tirolese national hero Andreas Hofer who opposed French and Bavarian armies in the mountains until he was captured and executed in 1812; and the redshirts of Garibaldi who, from a mere thousand landing in Sicily in 1860, became the army that liberated and united Italy. Others took part in the liberation of Greece under Alexander Ypsilanti and in the French and Polish revolutions of the 19th century.

Under the third heading come the French *francs-tireurs* during the Franco-Prussian War of 1870-71; possibly some Belgians during the First Great War; and clandestine troops preparing and finally taking part in the fight for liberation everywhere during the Second Great War. While members of Free Corps as under (a) and (b), if uniformed and provided with proper documents, are entitled to the protection of international law, and if caught should be treated as prisoners of war, those in category (c) risk the death penalty under martial law.

**Freedman, BARNETT** (b. 1901). British artist. Born in London, May 19, 1901, he gained a scholarship to the Royal College of Art in 1922. He designed posters for the L.P.T.B., Shell Mex, B.B.C., G.P.O., etc., also a postage stamp for the silver jubilee of George V, 1935. Freedman also illustrated Sassoon's *Memoirs of an Infantry Officer*. His paintings and drawings were purchased by the Tate Gallery, Victoria and Albert museum, and provincial galleries.

**Freedom of the City.** Award conferring the freedom of a city on the recipient. See Freeman.

**Freedom of the Press.** Liberty to print and publish without official licence. By the Press is usually meant the newspapers, but the term includes printing generally. Before the introduction of the military censorship in 1914 the British press had enjoyed this liberty since 1694, save for restrictions imposed by the paper duty, 1694-1861; stamp duty, 1711-1855; advertisement tax, 1712-1853; and libel laws which unfairly shackled expression of opinion until the middle of the 19th century, even to the restriction of references to foreign rulers.

Partial reports of parliamentary proceedings began to appear in

print in 1729, but were regarded as a breach of privilege for which summary punishment was inflicted. While this parliamentary privilege is still nominally preserved, reporters have been admitted to parliament since 1835.

From the 15th century in Roman Catholic countries the Inquisition of the bishops acted as censors of the press. At the Reformation Henry VIII assumed this control, and it was exercised by the Star Chamber till 1640. In 1640-43 the press was virtually free. In June, 1643, parliament revived the censorship; Milton's *Areopagitica*, or Speech for the Liberty of Unlicensed Printing, was published in 1644. The office of Licensor of the Press was operative in 1655-79 and 1685-94. The later struggles for a free press in Great Britain were carried on largely on political grounds, and the struggle has followed similar lines in all constitutional countries. See Censorship; Defoe; Journalism; Libel; Marprelate; Newspaper; Wilkes, John.

**Freedom of the Seas.** Term in international law. From earliest times two main doctrines have governed maritime commerce. In peace, the waters of the ocean are free and open to the vessels of all nations; in war every belligerent reserves to itself the right to capture the ships and property of its enemies. On the other hand, belligerents may not interfere with the ships and cargoes of neutrals, unless they violate the laws of blockade and contraband (*q.v.*).

From the beginning of its national existence, however, the U.S.A. has favoured the immunity from capture in time of war of the commerce even of belligerents. A treaty of such immunity was proposed by the U.S.A. to Great Britain, France, and Russia in 1823, but was declined. An attempt was also made to include a similar clause in the declaration of Paris, 1856. At the beginning of the Franco-Prussian War of 1870, Prussia declared her intention to refrain from capturing French merchant ships, if the French granted a similar immunity, but the stronger naval power refused, whereupon both belligerents resorted to customary practice. The question was considered at the first Hague peace conference, 1899, but as no decision was reached, it was remitted to the second conference in 1907 for consideration. The assembled powers expressed the wish that the laws of war on land should apply

as far as possible at sea, so that merchantmen and commerce of belligerents should be exempt from capture. During the First Great War, however, it proved impossible for any belligerent to give practical effect to this aspiration.

Among the Fourteen Points elaborated by President Wilson as the basis for an enduring peace was the following: "Absolute freedom of navigation upon the seas outside territorial waters alike in peace and in war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants."

There has been much controversy upon the meaning of this declaration. It has been asserted that the freedom was intended to cover neutral shipping only in time of war; conversely, that Wilson was restating the traditional American view. It seems most likely, however, that this article must be directly linked with Wilson's suggestions for a League of Nations, so that freedom of the seas would be assured to all who fulfilled their League obligations, but that the capture of private property of those who resorted to war in defiance of their League obligations could still occur.

The chief opponent of the American claim for freedom of the seas has been Great Britain, urging consistently that as maritime commerce plays such a direct and vital part in a war effort, to exempt it from capture would prolong wars and furthermore deprive a naval power of its most effective weapon. In spite of the humanitarian views of publicists, the hard facts of the First and Second Great Wars demonstrated the truth of this view, whilst they robbed the doctrine of a good deal of its theoretical importance by progressive extensions of the laws of contraband and blockade. Little today is heard of the doctrine, even in the U.S.A., and under modern conditions of warfare, where the whole national life of a belligerent is reorganized, it may now be considered to be obsolete, except so far as it guarantees freedom of trade for neutrals not violating the laws of contraband and blockade.

G. W. Keeton

**Free Economy.** Economic theory introducing a new monetary system, in which money would be devalued every month and replaced by new, so as to ensure a steady circulation. People would

endeavour to pass on the money before it declined in value, and the flow of money would maintain steady employment. Free economists support private enterprise and are opposed to Socialism.

**Free France** (*La France Libre*). Title assumed by those Frenchmen who accepted the leadership of



Free French badge, the Cross of Lorraine

Gen. de Gaulle after the surrender of the French government on June 22, 1940. It arose from the British official announcement of June 28, 1940, that "H.M. government recognize Gen. de Gaulle as leader of all free Frenchmen, wherever they may be, who rally to him in support of the Allied cause." The name was officially changed to Fighting France, July 4, 1942. See Fighting France; Gaulle, Charles de.

**Freehold.** The tenure on which all land is now held. Formerly (and still in theory) land could not be owned but must be held on some tenure from a lord, and ultimately from the crown. The land might be held on either free or unfree tenure. Knight service and socage were freehold tenures and copyhold was unfree. Knight service was abolished in 1660 and copyhold in 1926, so that all land today is freehold in socage tenure. This gives effect to the modern conception of land as patient of being owned, not merely held of a lord. A freehold must be of indefinite duration.

**Freelance** (Ger. *freier Landsknecht*, free land trooper). Term originally applied in Germany, and afterwards in other countries, to one who sold his military service to whom he pleased. This usually meant to the highest bidder, without regard to more than inclination or pay. In the later Middle Ages, and for some time afterwards, freelances were numerous in Italy and France, and spread over the rest of Europe. Sometimes called a soldier of fortune, sometimes a mercenary, the trooper wandered from place to place, if a noble, with a following of men-at-arms, or in company with a number of others like himself. Captain Dugald Dalgetty, in Scott's *Legend of Montrose*, was a soldier of this type. The English

form freelance comes from confusion with *Lanzknecht* (lance trooper). (See Condottieri; Franc-tireur; Mercenary.) The term is today applied to anyone who in politics, or any form of contest, preserves his independence of party or association. In journalism a freelance is a writer who earns a livelihood by contributing to newspapers and periodicals without being on the staff of any one of them.

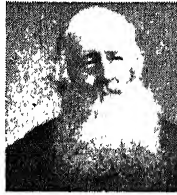
**Freeman.** One who is free, i.e. one who is not a slave. The distinction between the two classes, bond and free, is an old one. It was found among the Greeks and earlier. In Rome there were two classes of freemen, those who were born free and those who were freed. Among the Teutonic tribes of Europe, including the Anglo-Saxons, the freeman was the one who enjoyed political power and other privileges, who fought, held land, and, in general, formed the dominant class.

**Freeman.** Person admitted to the freedom of a city. The freedom, except in London, is purely an honour and carries no material benefits. Only a freeman of the city of London can be a candidate for the office of lord mayor there, and certain charitable funds are available for freemen or their dependents in genuine need. Freedom of the city may be obtained by being bound to a freeman according to the custom of the city and serving as an apprentice for a specified term; or by patrimony by sons or daughters (unmarried or widows) of a freeman; or by redemption or purchase by persons on the parliamentary register of voters for the city on their application to the city chamberlain.

The honorary freedom is a gift of the city, conferred upon a person of distinction. This is a token of honour in the form of a public address enclosed, with the roll of freemen, in a gold or silver casket. Medieval privileges that no longer apply were freedom from certain tolls and customs, exemption from military service outside the city, and the right to trade within the city. In the 14th century some foreigners obtained the freedom of the city by making large payments and giving security that Londoners visiting their countries should receive good treatment.

**Freeman, EDWARD AUGUSTUS** (1823-92). British historian. Born at Harborne, Aug. 2, 1823, he was educated at Trinity College, Oxford, and was elected a fellow. He settled down in the country to the career of a writer, making his

home from 1860 at Somerleaze, near Wells. His first book was *A History of Architecture*. 1849.



Edward A. Freeman,  
British historian  
Elliott & Fry

He also wrote a great deal for the *Saturday Review*, and travelled much abroad. Freeman's works place him in the front rank of British historians, and are based upon an exhaustive study of original authorities. An unfinished *History of Federal Government*, 1863, was followed by *History of the Norman Conquest*, 6 vols., 1867-99, which remains an authoritative study of the period, although later scholarship has declared against an excessive emphasis on Teutonic origins of English institutions.

In 1884 Freeman was appointed regius professor of modern history at Oxford, but his best work was done, his health was bad, and he died at Alicante, Spain, March 16, 1892. A man of strong and outspoken views, he attained some eminence as a Liberal politician, but failed to enter parliament. He denounced the iniquities of the Turks, and showed warm sympathy with the Greeks.

**Freeman, JOHN** (1880-1929). British poet. He was born in London, and early began to write for literary journals, contributing regularly after the First Great

War to *The London Mercury*. A first volume of verse was published in 1909; a collection, *Stone Trees and Other Poems*, in 1916. *Memories of Childhood* came out in 1918-19, and the next year he was awarded the Hawthornden Prize. His prose works included *Portrait of George Moore*, 1922; *English Portraits*, 1924; and a study of Herman Melville, 1926. Freeman died Sept. 23, 1929.

**Freeman's Journal.** *THE* Dublin daily newspaper. Started as *The Public Register*, or *Freeman's Journal*, a bi-weekly sheet, Sept. 10, 1763, it dropped its first title in July, 1807. In the opening part of the 19th century it became the organ of the Irish Nationalists. The paper was temporarily suspended in Dec., 1918, by British military authority because of publications calculated to create disaffection; and, on a similar charge, was the subject of two courts-martial in 1920. As a supporter of the I.F.S., it was partially wrecked by I.R.A. extremists in 1922. It ceased publication, 1924.

**Free Martin.** The sterile member of a pair of unlike-sexed twins in certain species of animal, e.g. cattle. Because the embryonic circulations of the twins may become confluent during their development, the hormones of each may affect the other. The male hormones of the male twin suppress to a greater or less extent the development of the female's sex organs, and often sterile free martins result. The derivation of the term is obscure.

## FREEMASONRY: ITS ORIGIN & HISTORY

Dudley Wright, former Editor of *The Freemason*

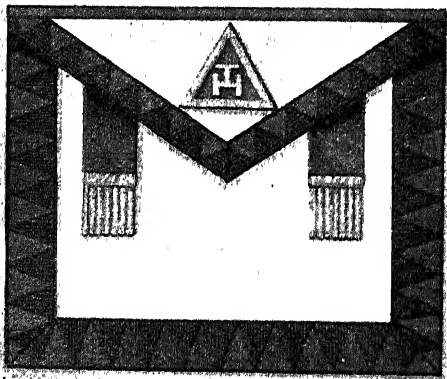
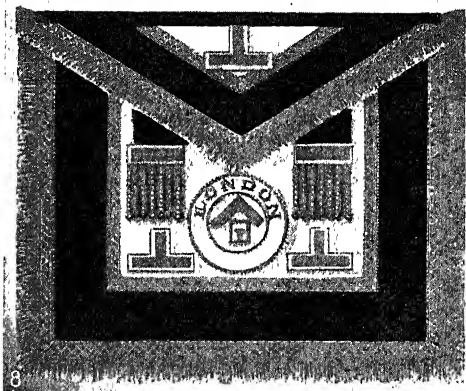
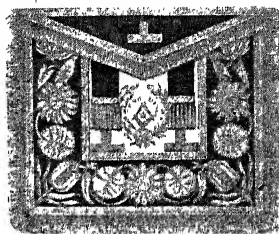
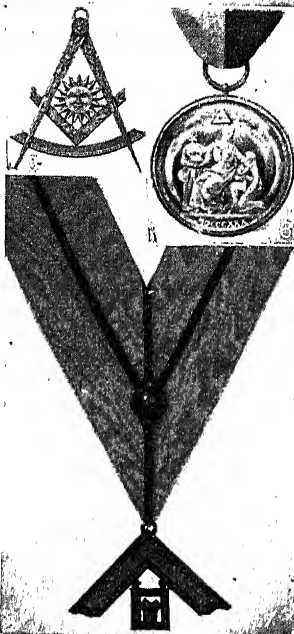
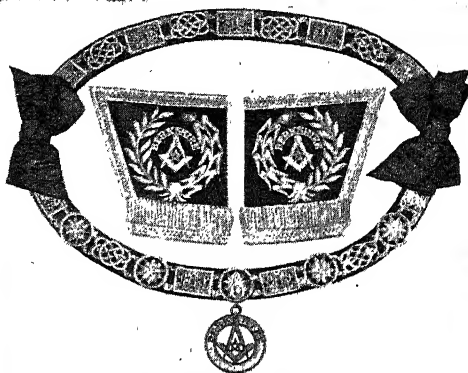
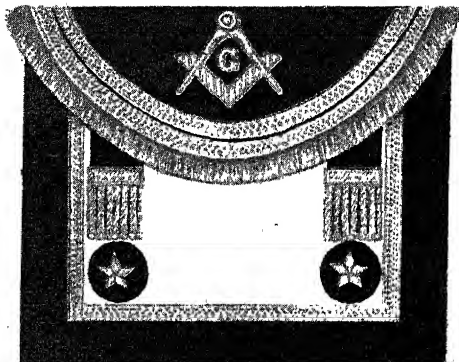
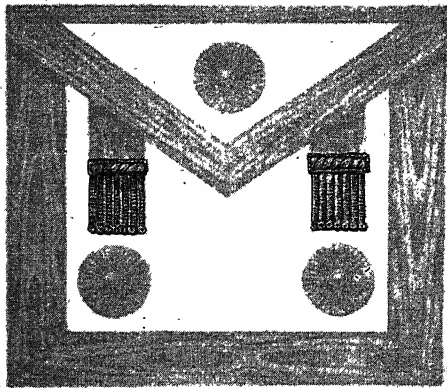
*This article gives some idea of the extent to which freemasonry has spread throughout the United Kingdom and over the civilized world.*

*See Mark Masonry; Royal Arch Masonry. See also Guild*

The origin of freemasonry cannot be traced with certainty. Many of its ceremonies and practices have a striking affinity with the ceremonies and ritual of the Eleusinian, Samothracian, Dionysian, and other ancient mysteries, as well as with the most ancient religious ceremonies known, particularly the initiatory rites and ceremonial proved to have prevailed among Indian races, the Druids, etc. Even the origin of the word freemason cannot be stated with precision. Legend ascribes it to an incident connected with the erection of Solomon's Temple, but O'Brien, in his *Round Towers of Ireland*, says that the word must be traced to Goban-Saer, the supposed architect of those towers,

that the word *Saer* means Freemason, and that those towers were masonic edifices, exclusively appropriated to the worship of the Great Architect of the universe. The existing masonic constitution is also akin to that prevailing in the ancient trade guilds of England and other countries.

The oldest masonic records in the British Isles are in Scotland. Edinburgh Lodge, No. 1, the oldest Scottish lodge, possesses record books from 1599, but these do not record the beginnings of that ancient organization. The famous Kilwinning Lodge is also claimed to have been in existence at that date as a governing body, but its minute books date only from 1642. There is a traditional list of grand



1 and 2. Master Masons' aprons 1, English; 2, Scottish.  
 3. Plumb rule, junior warden's jewel of office.  
 4. Apron, collar, and gauntlets of Provincial and District Grand Master. 5. Scottish Past Master's jewel.

6. Charity jewel. 7. English Past Master's jewel on collar. 8. Apron of London grand rank: those of Provincial and District (overseas) grand rank are similar. 9. Apron of English Royal Arch degree

# **FREEMASONRY: JEWELS AND BADGES OF THE CRAFT IN ENGLAND AND SCOTLAND**

*By courtesy of George Kenning & Son*



masters in England, dating from A.D. 290, beginning with Albanus, and ending, before the historical period, with the names of Charles Lennox, the first duke of Richmond, and Sir Christopher Wren. But the historical foundation even for these names, it must be admitted, is slender.

The first freemason to be initiated on English soil, so far as records show, was Sir Robert Moray, also a founder and first president of the Royal Society. He was initiated at Newcastle-upon-Tyne, May 20, 1641, the entry being ratified by the signatures and masonic marks of four brethren, including General Hamilton. Elias Ashmole, also one of the original members of the Royal Society, was initiated at Warrington five years later. Some founders of the Royal Society and its principal officers and members for several years were leading members of the masonic order.

The organization of the grand lodge of England was effected June 24, 1717, by the union of four lodges then meeting in London three of which are still in existence, and since that date grand jurisdictions in various parts of the world have been formed, all of which owe their parentage, directly or indirectly, to the grand lodge of England. The grand lodge of Ireland was formed in 1729; that of Scotland in 1736.

In the grand lodge of England two offices only are elective, viz. grand master and grand treasurer, the remaining offices being in the appointment of the grand master,

a similar custom pertaining to the grand lodges of Ireland and Scotland. The practice varies in the U.S.A. and other countries, but most, and in some jurisdictions all, officers are elected by the members of the grand lodges.

In England when a prince of the blood royal is elected grand master, a pro grand master may be appointed. The head of the craft in Scotland is known as the grand master mason. In private or subordinate lodges, the master, treasurer, and tyler are elected by the members, but it is essential that the master should first have served one complete year as warden.

In 1813 the designation united grand lodge of England was adopted as the official title, on the occasion of the union with some rivals of the original body, who, in 1751, had formed an independent grand lodge, known as the "Ancients," and who eventually secured as grand master the duke of Kent, father of Queen Victoria. He, however, reigned for one month only with the object of bringing about the union. The duke of Sussex, who followed him, was grand master until 1843. Later grand masters were the 2nd earl of Zetland; the marquess of Ripon; the prince of Wales (Edward VII); the 1st duke of Connaught; the 1st duke of Kent; the 6th earl of Harwood; the 10th duke of Devonshire; the 11th earl of Scarbrough.

The office of pro grand master disappears when a commoner is grand master, but recently that of assistant has been created.

The grand lodge of England has within its jurisdiction 46 provincial grand lodges in England and Wales and 35 district grand lodges overseas. There is not, however, inter-visitation between all the major grand jurisdictions, owing to the fact that a few have ceased to regard it as obligatory on the part of candidates for initiation to declare a belief in the existence of a Supreme Being and the doctrine of immortality, two of the most ancient landmarks

of the craft, set forth in the earliest Book of Constitutions, published in England in 1723. This, by the way, speaks of Inigo Jones, one of the names mentioned in the traditional list, as "our great master mason." The discussion of religious and political subjects also is strictly forbidden in British, American, and Asiatic lodges, although it enters largely into Continental masonry.

The growth of freemasonry has been particularly marked since 1914. An exception to this course appeared in Germany, where the movement was persecuted by the Nazi regime. The grand lodge of England has at least 4,000 lodges within its control, while the lodges throughout the world number more than 30,000 with an aggregate membership of about six millions.

#### Benevolent Institutions

Freemasonry the world over is noted for its benevolent activities. In England there are the Royal Masonic Institution for Girls, founded in 1788, with a senior school at Rickmansworth, Herts, and a junior school at Weybridge, Surrey, opened 1918, and about 1,100 girls receiving benefits; the Royal Masonic Institute for Boys at Bushey, Herts, with more than 1,000 boys; and the Royal Masonic Benevolent Institution which cares for aged freemasons, their widows and other dependent relatives, and has more than 2,000 annuitants of whom 100 occupy rent-free flats at Hove, Sussex.

The First Great War brought into existence the Freemasons' War Hospital in Fulham Road, the outcome of the original scheme for the establishment of a masonic nursing home and hospital, to which it has reverted, the institution (now at Ravenscourt Park) being founded on an endowment fund provided by subscription. It remains one of the few hospitals in the U.K. unaffected by the national health service, thus retaining its original character. In addition to these central institutions every English province and nearly every district has one or more funds for local relief. Ireland and Scotland also have their institutions and benevolent funds, whilst all the American jurisdictions have established various hospitals, crèches, and other institutions. The English headquarters are at Freemasons' Hall, Great Queen Street, London, W.C.2.

The term freemasonry is applied strictly only to what is known as Craft masonry. Outside this parent stock there are several branches.



Freemasons' Hall, Great Queen Street, London, headquarters of the grand lodge of England, opened July, 1933, as a memorial to English freemasons killed in the First Great War

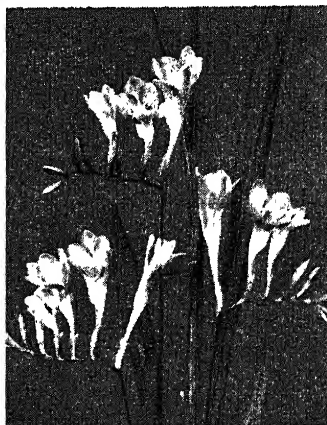
Royal Arch masonry is governed in England by the Supreme Grand Chapter, Mark masonry (including the Royal Ark Mariner degree) by the Grand Mark Lodge. The next largest masonic body is that of the Antient and Accepted Scottish Rite, followed by the Knights Templar. Other branches are the Allied Masonic Degrees, the Royal and Select Masters, the Order of Malta, the Knights of the Red Cross of Constantine, the Royal Order of Scotland, the Order of the Secret Monitor, and the Societas Rosicruciana. Initiation into Craft masonry is indispensable for admission into any of these subsidiary degrees.

**Freeport.** A city of Illinois, U.S.A., the co. seat of Stephenson co. On the Pecatonica river, 112 m. W.N.W. of Chicago, it is served by several rlys. Here in 1858 occurred the celebrated debate between Douglas and Lincoln, in which the former proclaimed the Freeport doctrine on the right of a state to decide its attitude to slavery. Settled in 1835, the town became a city in 1855. Pop (1950) 22,467.

**Free Port.** Harbour which ships of any nation may enter to load and unload goods by paying a uniform toll, and in which dutiable goods can be stored free of customs duty. The plan was developed in Italy in the 16th century for the convenience of merchants importing goods for re-export. It was extended to France, Germany, Copenhagen, Hong Kong, and Singapore. By the treaty of Versailles Germany undertook to lease to Czechoslovakia for 99 years areas in the harbours of Hamburg and Stettin as free ports. By a complementary clause parts of the Elbe, Niemen, Oder, and Danube were declared international waterways. Trieste was reconstituted a free port after the Second Great War.

Free ports may be valuable for countries without direct access to the sea. Their functions can be served by bonded warehouses, where dutiable goods are stored under customs supervision, no tax being payable until they are withdrawn for home use. British experience of bonded warehouses suggests that they may be more helpful to the transit and entrepôt trade than free port facilities, since they ensure adequate accommodation.

**Free Reed.** In musical instruments in which the sound is due to the vibrations of a reed or tongue the reed is termed free when it is



*Freesia.* Flowers and leaves of this sweet-scented plant

just small enough to pass through the frame on which it is fitted. When it is a little larger and beats against the sides of the opening, as in organ trumpet pipes, it is called a beating reed or striking reed. Most of the tongues used in the harmonium and American organ are free reeds. See Organ.

**Freesia.** Small genus (two species only) of bulbous herbs of the family Iridaceae. They are natives of the Cape of Good Hope. They have long, narrow, grass-like leaves and large funnel-shaped white or yellow flowers. *F. leichlinii* has yellow or cream-coloured flowers, and *F. armstrongii*

pure white blossoms, marked with violet lines and sweetly scented.

**Free Soil.** Name given in the U.S.A., before slavery was abolished there, to soil on which slavery was not permitted. Early in the 19th century the Union consisted of an equal number of slave and free states, each entry of a new slave state being balanced by the entry of a new free soil state.

In 1847, the anti-slavery cause having considerably increased its strength, it was proposed to make slavery illegal in all the territories, and so confine slavery to the existing slave states. To support this the Free Soil party was formed. It consisted of both Democrats and Whigs, seceders from their own parties, and in 1848, at a national convention at Buffalo attended by 465 delegates, nominated Martin van Buren as its presidential candidate; he failed to carry a single state in the election, and they were equally unsuccessful in 1852, but they sent members to congress and were influential until 1856, when they gave up their separate organization to help form the Republican party. The party motto was free soil, free speech, free labour, and free men.

**Freestone.** Sedimentary rock, usually sandstone, but sometimes limestone, which can be easily worked with the chisel and lacks the usual tendency to split along certain planes. It is extensively used in architecture for mouldings.

## FREETHOUGHT AND FREETHINKERS

\*Joseph McCabe, Writer on Rationalism

*The point of view of the freethinker, as that of believers in the various religions, is the subject of an article in this Encyclopedia. See also Apologetics; Christianity; Dogma; Rationalism; Renaissance*

Though the appellation "freethinker" has not entirely lost the aspersive sense which generally attached to it among Christians from the time of its coming into common use (c. 1700), the term "freethought" may now be regarded as a scientific label for the attitude of mind which challenges all demands for belief on grounds of traditional or documentary authority. Broadly considered, this attitude reacts in the same way against historical and other propositions as against religious dogmas and narratives; but inasmuch as the latter have always made the most menacing claim to uncritical acceptance, it is to the critical refusal of acceptance in their case that the term has always been commonly applied.

On a wide survey it becomes certain that while the normal

attitude of the untrained mind towards all serious or minatory assertion concerning the unknown is one of credulity, there has occurred at all stages of human development some amount of variation towards rational doubt. Alike among savages, among barbarians, and among the more-civilized peoples of all times and countries, there has always been a varying minority of minds who spontaneously doubted more or less the truth of current myths, legends, and dogmas. The "acceptational" attitude is thus a natural variation, like another, and it depends for its spread upon the totality of the circumstances which check or make for free discussion. These may be simply economic, or largely cultural or political.

Inasmuch as religious systems are readily able to employ all three

factors, the assailing doubt generally suffers from that disadvantage; but even in a primitive community the economic factor may at times be negatively on the side of freedom, as when a series of famines may lead to the extinction, as impostors, of all the "rain-makers" of an African people. The primary bias to doubt, however, being by far less common than the contrary, freethought in progressive conditions is always a matter of resort to methods of rational appeal (whether well or ill conducted) as against the common bias to belief reinforced by "authority" on social, political, and economic lines.

That both attitudes are in some degree primarily temperamental is indicated by the significant fact that many adherents of a modern orthodoxy are found to show a spontaneous animus against ancient "freethinkers" as such, though the beliefs which those doubters rejected as false are also rejected as false by their modern assailants, and often described by them as pernicious.

Historically speaking, it is broadly certain that freethought spreads in the ratio of the culture contacts of peoples, whether by way of simple intercourse or of literary communication. The mere differences of early religious beliefs, being so marked and so innumerable, constitute a propulsion to doubt when they are simply noted. Where the doubt has most intellectual elbow-room it will be most developed.

#### Ancient Times

Thus, while doubt concerning the gods can be seen among the priestly circles of ancient India, Babylonia, and Egypt, to lead to a compromise on the lines of a pantheism which conserved the old cults upon economic motives, in the freer world of republican Greece, which enjoyed the maximum of culture contact and free discussion, and had the smallest development of priestly organization, the critical process was both more general and more searching. Josephus, in his diatribe Against Apion, expressly reproaches the Greeks with the multiplicity and divergence of their historical reconstructions as contrasted with the unquestioned uniformity of tradition among his own race.

The very fact that that tradition had undergone much priestly manipulation in the historic past had passed out of orthodox Jewish knowledge; the Jewish community having come to represent a selection or survival of conformists and devout believers from among a

race which had parted with multitudes of its doubters.

In that case the retaining power had been the successfully established cult of the Sacred Book. In Greece there was neither Sacred Book nor centralized priesthood. And the subsequent history of freethought turns mainly on the faith-commanding power of Sacred Books, whether in subordination to or in alliance with other factors. Roughly speaking, the history of the Catholic Church down to the Reformation consisted in the subordination of the authoritarian claims of the Sacred Book to those of the hierarchy, the former having been found to involve constant risks of destructive schism.

#### Protestantism and Schism

This was freshly illustrated in the schisms which rapidly overtook Protestantism, when that movement erected the claims of the Sacred Book to belief above all others; and to such schism the Catholic hierarchy were able to point as discrediting Protestantism from the point of view of the general bias of faith.

Since the Reformation, the history of western freethought has been one of more or less continuous gain in intellectual prestige as against the authority of the Sacred Book in Protestant countries and that of the hierarchy in others, the lines of advance being those of science, historical criticism, ethics, and democratic politics. The bias of faith may often be found still subsisting in promoters of all of those movements; but the collective result is a growing proclivity to the critical method, broadly known as that of rationalism.

Perhaps the most generally disintegrating process is that which systematically develops the early factor of culture-contacts by the scientific comparative study of all the primitive forms of religion, from which the later are now generally recognized to derive. Religious beliefs are thus themselves in a state of increasingly rapid change, even among biased believers; and the critical process, grounded on the sciences and rationalistic ethics, becomes increasingly confident, even while growing less polemical.

The historic process has been, as regards the more educated classes or sections, one of action and reaction. In post-medieval and Renaissance Italy, clerical abuses promoted freethought; and in France and England after the Reformation it advanced considerably after periods of religious strife, being active in the later years of Elizabeth, and again after

the Restoration. Yet again, as a result of both scientific and scholarly progress, it spread greatly, under the form of Deism, in the England of the first half of the 18th century.

Commercial and imperial expansion and the Methodist Revival later weakened the intellectual activity, which, however, was taken up in France, then ripening for the Revolution; whereafter political reaction in both countries produced a reign of conformity in the middle and upper classes, leaving the new democratic freethought partly at work among the lower, in so far as they were accessible to propaganda.

An organized freethought propaganda, mainly democratic, is a notable feature of the second half of the 19th century, alike in Britain, the U.S.A., France, Germany, and other European countries. Proceeding as it did on the subversive criticism alike of science and scholarship as against the Sacred Book, it was most active in the period of active religious resistance to such criticism, flagging as a specific activity when the Churches in general began to accept that criticism, thereby weakening their own foundations and turning belief into a passive rather than an active force.

#### Influence of Freethought

The relative subsidence of specific freethought propaganda is thus a mark of its success, the educative process being thenceforth carried on by the specific activities of science and ethics and general truth-seeking research. Churches which a few centuries ago were shedding blood for supernaturalist doctrines of sacraments, and later were battling against Deism for the divinity of Christ, are now concerned to prove His mere historicity.

Throughout civilized Europe, while a measure of social ostracism still falls in some countries upon those who openly reject the whole body of traditional religion, the shifting of the religious ground has greatly weakened the power of the Churches to resort to forcible suppression of criticism, and the economic and cultural obstacles to freethought are really the more powerful. In Great Britain it has been gradually recognized that persecution merely multiplies the assault, giving it new economic resources through popular interest and sympathy. Alike in the time of Thomas Paine and in that of Charles Bradlaugh, persecution greatly strengthened the popular movement. At the same time, growing knowledge of all kinds weakens

both the temper and the social basis of persecution; and churches whose clergy are pronounced heretics from the point of view of their own official creeds are largely incapacitated for repressive measures. Many eminent literary men of the last generation having committed technical "blasphemy" in a supreme degree, that offence is now never prosecuted in Great Britain save when it contravenes police regulations.

During the 20th century the economic factor has been operative. Between 1920-30 freethought in alliance with Communism captured tens of millions of workers in Asia, Europe, and S. America. Fascism, on the other hand, owing its existence to "regimented" thought, condemned all free thought as such.

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**Freetown.** Seaport and capital of Sierra Leone, British West Africa. The town is situated on the Sierra Leone river, with wooded mountains to the S. and E., at the N.W. extremity of the Sierra Leone peninsula. European residences are on the highlands, reached by a mountain rly. Freetown was founded as Granville-town in 1788 as a home for liberated African slaves.

The harbour is the finest and one of the most important in W. Africa. A rly. runs inland to Pendembu, a distance of 228 m. Motor roads have been constructed and there is connexion by air with Great Britain. The town possesses a cathedral and several educational establishments. The chief exports are iron ore, palm kernels and oil, kola nuts, cocoa, diamonds, ginger, and hides. Free-

town was a naval and R.A.F. station during the Second Great War and a terminal of the aeroplane ferry route across Africa. Pop. 65,000.

**Free Trade.** Trade free from any restrictions. The term is used particularly to denote the system in which (a) goods from abroad are allowed to enter a country without payment of customs taxes greater than the excise taxes levied on similar goods produced within the country; and (b) goods can be imported without government licence.

The theory of free trade depends on the belief that all trade is advantageous and increases total wealth because it permits greater division of labour and enables people to specialise according to their aptitudes. Trade between nations makes available to other countries the special qualities of individual countries (minerals, vegetation, climate, etc.). The more trade between countries can be increased, the greater the geographical division of labour and the greater the total wealth produced. Conversely, any restriction causes economic resources (land, labour, and capital) to be used in ways that are not the most suitable, and so lessens total income. A free trade nation can export the goods which it can produce at the least comparative cost and can receive in exchange goods which it could manufacture only with more productive units (land, labour, capital).

Adam Smith in *The Wealth of Nations* (1776) cogently argued the case for free trade, but the Napoleonic wars prevented its immediate adoption. In 1823, however, various import duties were removed, and during the following twenty years this process continued. In 1846 the Corn Laws, designed to keep out foreign wheat, were repealed. By 1860 the U.K. had changed from a highly protected to a free trade regime, and for the next 50 years practised the "policy of plenty."

The country progressed greatly, in population, national income, foreign trade, shipping, etc. But other countries, such as Germany, with a strong protectionist policy, also flourished. The ideal of a free trade world did not materialise. Faith in Great Britain's isolated practice of free trade wavered, and by 1903 Joseph Chamberlain was urging tariff reform and imperial preference; until 1914 these matters were party politics. During 1914-18 the free trade policy was partially abandoned by the imposition of the McKenna duties (1915) to save cargo space, and imperial preference (giving lower duties on Empire produce) was extended to "key industries." In 1921 the latter was intensified, and the Safeguarding of Industries Act was passed. This imposed high taxes on numerous classes of imports in order to protect industries established during the war. In 1932 free trade was fully abandoned by the introduction of a comprehensive protective tariff. Since then the U.K. has found it necessary also to resort to a system of quotas, licences, exchange controls, etc., more elaborate than that ridiculed by Adam Smith.

Great Britain's experience suggests that although free trade may bring maximum income, this may be less desirable to a country than (a) diversified industries; (b) the encouragement and maintenance of industries important for defence; (c) the ability to protect itself against fiscal and political changes in other countries and against inventions, discoveries, and technological changes that might lessen its ability to sell goods abroad and render specialised equipment and skill obsolete. Extreme specialisation is dangerous in a changing world. Thus free trade remains an ideal rather than a practical policy. The expansion of world trade is now being sought within an elaborate framework of protective duties.

**Free Wheel.** Term given to a gear or pulley wheel which is provided with a clutch or detent in such a manner that the wheel may either turn with the axle on which it is placed or rest idle on the axle, while the latter turns. In the former case the wheel is working, in the latter idle. A now familiar example is provided by the common bicycle and another by certain forms of lawn-mowers in which the wheel "works" when the mower is moved forward, but is idle while the machine is moved



Freetown, Sierra Leone. Panoramic view from the sea of this British West African port; its fine harbour makes it an important trade centre

backwards. The principle of the free wheel has been applied to motor vehicle transmission with the object of making gear changing easy and of allowing the vehicle to run freely without driving the engine on downward gradients. The use of a free wheel between gear box and propeller shaft simplifies gear changing greatly, since the gear box is completely isolated from the transmission and the engine whenever the clutch is disengaged. *See* Cycling; Motor Vehicle.

**Free Will.** The theory that man is able at any time to take any action physically possible, whatever may be his circumstances, character, or past history. In practice it is now as a rule restricted to moral decisions. Belief in freedom of the will is general for the following reasons. We cannot predict our own future decisions. We have a strong feeling that we are choosing freely between solutions; even the chronic drunkard tells himself that the glass he is drinking now will be the last. During severe mental struggles we suffer from painful doubts, the issue seems uncertain, and may be decided by what appears on the surface to be a trivial coincidence. Free will gives an answer to the unacceptable argument that since God made both man and the universe He must be responsible for the evil in that universe.

The concept is not used in psychology, which is based on the principle that every event has its sufficient cause. The factors which govern moral decisions are known and follow the general laws which govern mental conflicts. Some of the causes of behaviour are compulsive. Many are unconscious, and it is this which makes it impossible for us to foresee the outcome of some moral struggles. The term free is therefore used to mean that reason is being employed in the present situation, and that the decisions of the mind are not dominated by morbid symptoms, misplaced emotions, buried memories, etc. *See* Determinism; Obsession; Unconscious; Will.

**Free Will Baptists.** Arminian section of the Baptist denomination in America, corresponding to the General Baptists in Great Britain. Originating about 1780 through the preaching of Benjamin Randall, one of Whitefield's converts who joined the Baptists, they separated from the Baptist body, which at that time was strongly

Calvinistic, and taught Arminian doctrines. *See* Baptists; Calvinism.

**Freezing.** Metallurgical term. When a liquid metal is cooled through its freezing point, the regular drop in temperature is arrested for a time by the change to the solid state. Pure metals and certain alloys freeze at a constant temperature, but most alloys apart from eutectics and intermetallic compounds freeze over a range of temperature, through which part of the mass is solid and part liquid. Molten metals have amorphous structures, the atoms being distributed at random, but on freezing the atoms arrange themselves into a systematic crystal lattice. X-ray examination shows that the internal structure is beautifully symmetrical.

Solid metals are sometimes frozen in the solid state by immersing in liquid air or carbon dioxide, when advantage may be taken of the resulting contraction. In the engineering industry valve seatings, etc., may be frozen before insertion into the engine body. When the metal returns to normal temperature, it expands and makes a tight, immovable fixture.

**Freezing.** In finance, the immobilising of monetary assets, particularly those of foreign nationals. Normally vast sums are held in, e.g., London, and in British investments, by foreigners, and these are freely usable by the foreign national and transferable, through the foreign exchange market, abroad. At a time of national emergency it is necessary to prohibit or restrict such operations, and money may, therefore, be frozen by government decree. Frozen funds cannot be used by the holders, even within the country. Their use for his overseas purchases is prohibited, and his own war effort thereby hindered. By restricting the use of money belonging to neutrals, its possible transfer to the enemy is prevented.

Control of foreign funds in Great Britain during the Second Great War was complicated and extensive. Not only were the holdings of the enemy completely frozen, but also those of countries, including the Channel Islands, overrun by Germany. Funds belonging to certain neutral countries could be transferred abroad or used in Great Britain for purchases within limits laid down by the Treasury. By a decree of June 17, 1940, on the capitulation of France, President Roosevelt froze all French assets in the U.S.A. Germany

practised freezing before 1939, and certain Spanish assets were frozen during the Civil War of 1936-39.

**Freezing Machine.** Double pail for making ice-cream. Ice and salt, broken very small, are packed into the outer pail in layers of three inches of ice and one of salt nearly to the top. The cream mixture is poured into the central pail, which is provided with a dasher, its handle passing through a hole in the top; this is turned until the mixture is set. *See* Ice Cream.

**Freezing Mixture.** Mixture of two substances, usually ice or snow and some kind of salt, which produces great cold. When common salt is added to snow (or powdered ice) which is at 0° C., its first effect is to lower the freezing point of that part of the snow with which it is brought into immediate contact; some of the snow is accordingly melted and forms a strong solution of salt. In this solution the molecules of water and salt enjoy much greater freedom of motion than in the solid form, and require extra energy, which is provided in the form of great heat from the surroundings. Thus the temperature of the snow is reduced below its normal freezing point, and at the same time the saline solution melts more snow, this process continuing until a limiting low temperature is reached at which the whole mixture freezes. A temperature of -21° C. can be reached in this way with a mixture of snow and common salt, but by the use of other salts which dissolve with greater absorption of heat much lower temperatures can be obtained. For example, calcium chloride in its crystalline form, mixed with snow in the proportion of 10 parts to 7, will produce a temperature of -55° C. *See* Refrigeration.

**Freezing Point.** Temperature at which a solid and a liquid are in equilibrium at a given pressure. In other words, the freezing point of a liquid is the melting point of a solid. The freezing point of water, that is, the temperature at which it changes into ice, is one of the fixed points on the thermometric scale (0° Centigrade, 32° Fahrenheit). Liquids may be roughly divided into two classes as regards the properties they exhibit in the process of freezing. Water undergoes crystalline solidification, in which there is a change of volume, and the liquid gives out a definite quantity of heat, called the "latent heat," in its abrupt change to the solid form. Molten glass is a liquid which undergoes "amor-

phous" solidification; as the temperature falls the glass ceases to run freely, and becomes viscous, then gradually hardens into a solid. The second class of liquids can hardly be said to have a definite freezing point, although the corresponding solids have a melting point, *i.e.* the temperature at which they begin to run.

With the first type, in which freezing is an abrupt change, it is significant that the freezing point is not absolutely constant, but varies under pressure. Water expands when it freezes, and the effect of pressure is to lower the freezing point. This accounts for the slipperiness of ice, the surface becoming water under pressure. Paraffin wax, on the other hand, contracts in freezing, and here the effect of pressure is to raise the freezing point. Those liquids which can solidify only by expanding are hindered from freezing by external pressure; those which have to contract in order to freeze are helped by external pressure.

The freezing point of a liquid is lowered by the presence of a salt dissolved in it. Thus a solution of common salt in water will not freeze until its temperature has been lowered considerably below the freezing point of pure water. The reason for this appears plainly from the molecular theory. According to this theory the molecules of water, which in the liquid form have considerable freedom of movement, have to occupy definite relative positions when the water assumes the form of ice. When pure water is cooled to 0° C., the energy of the molecules is sufficiently diminished to allow attractive forces to come into play, under which the molecules assume the positions required for freezing, but the presence of particles of salt in the solution hinders this process, and the energy of the molecules of water must be diminished by a further reduction of temperature before solidification can take place. See Freezing Mixture; Temperature.

**Freiberg.** Town of E. Germany, in Dresden region. It is on the r. Muzbach, a tributary of the Mulde, 20 m. S.W. of Dresden, and was the mining centre of the Erzgebirge. Around are exhausted silver and lead mines, while the town had an old and celebrated school of mines. Other industries are the manufacture of textiles, silver, iron, and brass goods, cigars, thread, chemicals, beer, leather, and china. The chief building is the 12th century

Gothic cathedral, restored in 1893, and containing a famous doorway, called the Golden Door, which has some magnificent sculptures.

S. Peter's church is noteworthy, and there are old houses and remains of the town walls, parts of which have been turned into promenades. The town grew up around the castle of Freudenstein, which became a residence of the dukes of Saxony. One of them rebuilt it in the 16th century. The silver mines were opened about 1250. The town lay within the Russian zone of occupation after the Allied conquest of Germany in 1945. Pop. (est.) 37,000.

**Freiburg.** Capital of S. Baden district, W. Germany. Distinguished by its beautiful Gothic cathedral and famous old university, it stands between the W. slopes of the Black Forest and the Rhine, on the river Dreisam, 40 m. S. of Strasbourg. A well preserved inner town of mainly medieval character was surrounded by modern outskirts with fine public buildings and thriving industrial suburbs. The cathedral, with the only Gothic tower completed in Germany in the Middle Ages, is built upon Romanesque foundations, begun about 1200; the spire in red sandstone and an altar by Hans Baldung rank among the world's masterpieces. The cathedral was damaged and much of the old town wiped out by heavy air raids during the Second Great War. The French 1st army captured the city April 21, 1945.

Four other old churches built between the 13th and 18th centuries, two town halls (1559 and 1543-82), some fine merchants' halls, archbishop's palace, and the university, mostly modern, though founded in 1457, were other features. Textiles, engineering, electrical and musical industries, a rly. and air line junction, and its rôle as a centre of the wine trade, contributed to Freiburg's importance. Founded in 1120, it belonged to Suabian and Hapsburg rulers, was several times annexed by the French, and from 1805 was in Baden. Pop. (1950) 109,717.

**Freight.** Word derived from the Dutch, and meaning originally the burden or cargo of a ship. Hence it came to mean the rate paid for the carriage of goods by sea, and in this sense it is now chiefly employed. It is used in the U.S.A. for the carrying of goods by land, and railway freights is a common term, while a freight train is the equivalent of the goods train of Great Britain.

**Freiherr.** A German title. It means free man or free lord, its origin being like that of baron. At first it embraced the whole peerage, until in the 16th century the emperors began to bestow it as a special title. All German sovereigns until 1918 retained the right to create *Freiherren*, who rank after the counts or *Grafen*. The title is hereditary. See Baron.

**Freiligrath, FERDINAND** (1810-76). German poet, born at Detmold, June 17, 1810. His first volume of poems appeared in 1838. Beginning with *Ein Glaubensbekenntnis* (A Confession of Faith), 1844, he wrote some of the finest of Germany's revolutionary songs. After the failure of the revolution, he was an exile in London, until the amnesty of 1866. He died March 18, 1876.

**Freising.** Town of Germany, in Bavaria. It stands on the left bank of the Isar, 18 m. N.N.E. of Munich, and its chief industries are the making of agricultural machinery, brewing, and printing. Founded in 724 and an important ecclesiastical centre in the Middle Ages, it is famous as the seat of the Bavarian brewing academy, in a former Benedictine abbey. The cathedral, parts of which date from the 12th century, was restored and altered in the 17th century. There are remarkable churches, including S. Benedict's, a Rathaus, and the palace of the bishops. Otto of Freising, the chronicler, was bishop here in the 12th cent. Pop. 15,126.

**Fréjus** (ancient Forum Julii). Town of France in the dept. of Var. It stands on the Gulf of Fréjus, 22 m. S.W. of Cannes, and is an old Roman station containing many Roman remains. It has been an episcopal see since the 4th century. The baptistery is 5th century work, and parts of the cathedral date from the 12th century. The town is a mile from the coast, and the P.L.M. rly. line runs through the completely silted-up ancient harbour. It was liberated by the Allies Aug. 16, 1944, the day after the Allied landings in the S. of France. Pop. (1951) 13,452.

**Fremantle.** Seaport of W. Australia. It stands at the mouth of the Swan river, 12 m. S.W. of Perth, with which it has rly. and river communication. It has a well equipped harbour, with depth of 36 ft. at low water, and is a port of call for European mail boats. Surf bathing is available. Among the chief buildings are a fine town hall (1887). Industries comprise smelting, iron founding, engineering, sawmilling, and boat building.



and there are flourmills, breweries, and tanneries. Wheat and timber are exported. Pop. (1954) 47,269.

**Fremantle**, SIR EDMUND ROBERT (1836-1929). British sailor. He was born in London, June 15, 1836, a younger son of the 1st Lord Cottesloe, and entered the navy in 1849. He saw service in Burma, 1852; New Zealand, 1864-66; and Ashanti, 1873-74. Promoted rear-admiral in 1885, he was commander-in-chief in the East Indies, 1888-91; in China, 1892-95; and at Plymouth, 1896-99. Knighted in 1899, he retired with the rank of admiral, and died Feb. 11, 1929.

His son, Sir Sydney Robert Fremantle, was born Nov. 16, 1867, and entered the navy in 1881. He was promoted captain 1903 and served in the Dardanelles, 1915, later being appointed deputy chief of the naval staff. In 1919 he was given the command of a battle squadron of the Atlantic Fleet and was c.-in.-c. at Portsmouth, 1923-26. Knighted in 1919, he retired in 1923. He published *My Naval Career*, 1880-1928, in 1948.

**Fremitus** (Lat., roaring noise). Vibration produced in the chest when the patient speaks, and in certain abnormal conditions, such as some forms of pleurisy or catarrh, simply by breathing. It is detected by the palm of the hand placed flat upon the chest, and its presence or absence may form a useful diagnostic sign in respiratory disease.

**Frémont**, JOHN CHARLES (1813-90). American explorer. Of French extraction, he was born at Savannah, Georgia,



*Mr. Frémont*

Jan. 31, 1813. (Graduating at Charleston College, 1836, he accompanied a survey party through Georgia, N. Carolina, and Tennessee in 1837, and surveyed Nebraska, Dakota, Minnesota, and Iowa, 1838-40. During 1842-54 he explored Oregon, California, and New Mexico, and did much to open up the far west to settlers.

A senator in 1850, he was nominated Republican candidate for the presidency in 1856, but his anti-slavery sentiments angered the Southern states and he was defeated by Buchanan. In the Civil War he was major-general in command of the W. division at St. Louis. The rly. crisis of 1873 ruined him financially, but he was

governor of the territory of Arizona, 1878-83. He died in New York, July 13, 1890. *Consult* Lilo, A. Nevins, 2 vols., 1928.

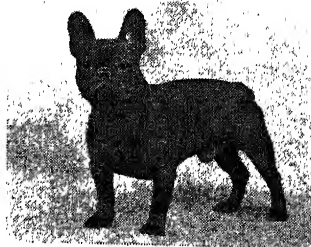
**Frémont Peak**. Mountain of the Rocky Mts., U.S.A. In Wyoming, it is the highest point in the Wind River Mts., being 13,781 ft. high. It was ascended in 1842 by John C. Frémont, hence its name. Frémont Pass is in Colorado in the Rocky Mts. It is 11,300 ft. high.

**French**. River of Ontario, Canada. It drains Lake Nipissing, flowing from it S.W. for about 55 m. into Georgian Bay. This was the route by which early French explorers reached Lake Huron (hence the name), and for 150 years formed the regular approach to the Upper Lakes.

**French**, SIR JOHN. *See* Ypres, 1st Earl of.

**French**, LESLIE RICHARD (b. 1904). British actor and dancer. Born at Bromley, Kent, April 23, 1904, he was educated at the London College of Choristers and for four years sang solos at ballad concerts and churches in London. In 1918 he joined the Ben Greet company. Performances as Feste, Puck, and Ariel established his reputation as a Shakespearian actor of grace and originality, and he played for successive seasons at the Open Air Theatre, Regent's Park. In ballet his performance as Everyman was notable.

**French Bulldog**. Breed of medium sized dogs, probably the descendants of English bulldogs left behind in France after the Napoleonic wars. Of bulldog type, without the exaggerations of the present-day bulldog, they were introduced into England from France in 1893. The head is massive and broad with bat ears, well laid back muzzle, and square and powerful lower jaw. The body is cobby and muscular, the tail short. The coat is fine, smooth, short, and



French Bulldog. A champion specimen

glossy. Colours are brindle, in which a little white is permissible, and pied, in which white pre-

dominates. Ideal weight, dogs 28 lb., bitches 24 lb.

**French Church**. *See* Gallican Church.

**French Cricket**. Game for any number of players. A cricket bat and a cricket ball should be used. All join in trying to bowl the batsman—by striking him on the leg below the knee with the ball—or to catch him out. Runs are scored by passing the bat completely round the legs. The batsman stands with his feet together and must not move them.

**French Horn**. Most important brass instrument used in the orchestra. It is of tenor compass, and of mellow, vocal tone.

**French Polishing**. Process of applying a smooth, shining surface to wood by the application of french polish, which is a solution of gums or gum-resins. The composition of french polish varies, but shellac is always the main ingredient; the solvent is alcohol—spirits of wine, methylated spirit, or "finish," which is spirit denatured by the addition of shellac, 3 oz. to the pint, so that it can be sold duty free by an unlicensed dealer. The simplest form is 6 oz. of shellac in a pint of spirit; mastic, sandarac, elemi, or benzoin may be included.

The surface of the wood to be polished is smoothed with glass-paper; then its pores are filled with a paste of plaster of paris or whiting and linseed oil coloured to match the wood, which can be darkened at this stage by a suitable colouring agent. The surface of the wood is again smoothed. A pledget of woollen rag or cotton wool saturated with the polish is enclosed in a piece of close-textured cotton fabric to make a smooth, firm pad. A few drops of linseed oil, to act as a lubricant, are applied to the face of the pad which is rubbed over the wood with a free, continuous, circular movement. More french polish is applied to the pledget from the back of the pad as required.

The spirit evaporates during the polishing and leaves on the wood a hard surface of shellac. After an interval the first application is rubbed down with fine sandpaper and the polishing is repeated until a uniform surface is obtained. This is left for a few days, and then the surface is wiped with a pad soaked in thinner polish, and after that with a small quantity of spirit. The process, simple as it sounds, is in fact highly skilled, and is rarely carried out satisfactorily by an amateur.

## FRENCH REVOLUTION, 1789-1795

A. D. Innes, Author of *A General Sketch of Political History*

*This article deals with a special movement in French and European history. See the articles on Mirabeau, Robespierre, and the great figures of the Revolution; those on Directory; Feuillants; Girondists; Jacobins, etc. See also Europe, France; Louis XVI; Napoleon*

The French Revolution is the name given to that period of volcanic upheaval in France, usually reckoned as beginning with the meeting of the States-General in May, 1789, and closing with the establishment of the Directory in Oct., 1795. Its ideal was set forth in the three words Liberty, Equality, Fraternity. In form it was a terrific convulsion; its methods trampled its principles in the mire; it issued, not in democracy, but in Caesarism. Nevertheless it undermined the foundations of the old order of privilege, and inaugurated the long struggle for the political, social, and economic emancipation of the masses of the European population.

France in 1788 had reached the stage at which drastic reforms had become a sheer necessity; failing reforms, the only possible alternatives were a stormy revolution or the establishment of an irresistible tyranny. Her political system, consummated under Louis XIV, was an uncompromising absolutism which allowed the people no share whatever in the government. The king ruled through ministers whom he appointed or dismissed at his own pleasure—ministers nearly always chosen from the aristocracy,

and responsible to no one save to the king himself. Socially, the population was divided into rigid castes, forming primarily three groups, the *noblesse* or aristocracy of birth, the clergy, and the commons. In France all the members of a noble family remained of the *noblesse*, not commoners at all, from generation to generation. The clergy were separated from the rest not by birth, but by the rule of celibacy and by their sacred functions.

In the towns there was a middle class—the *bourgeoisie*, professional men and traders—and a working class; in the country districts the peasantry were virtually the serfs of the *seigneurs*, the landed proprietors who owned the soil, to whom they were legally bound to render payments and unpaid services, and who exercised a broad jurisdiction over them. Economically, *noblesse* and clergy were almost exempt from taxation. The whole burden of providing the national revenue, the cost of the court, of war, of administration, was on the shoulders of the commons, and pressed most heavily upon the peasantry who were least able to bear it. There was no liberty of the individual.

But the seeds of change had been sown by the "intellectuals." The mockery of Voltaire had shattered the sense of reverence for conventions. The writers in the *Grande Encyclopédie*, D'Alembert, Diderot, and others, had challenged all the principles upon which the social and political structure was based. Jean Jacques Rousseau had propounded palpably revolutionary doctrines, notably in his *Contrat Social*, teaching that the organization of society rested upon an original contract imposed by the strong, for their own interest, upon the weak, claiming that the ultimate authority is the Will of the People, and insisting upon "natural rights," the Rights of Man.

With a light heart France, in order to injure England, had taken the part of the Americans, and French aristocrats, unconscious that they were sporting on the crater of a volcano, played guily at advancing those same revolutionary ideas. Meanwhile, France was rushing towards bankruptcy, the result of accumulated expenditure upon wars of aggression from which there had been but very brief respites during the last century and a half.

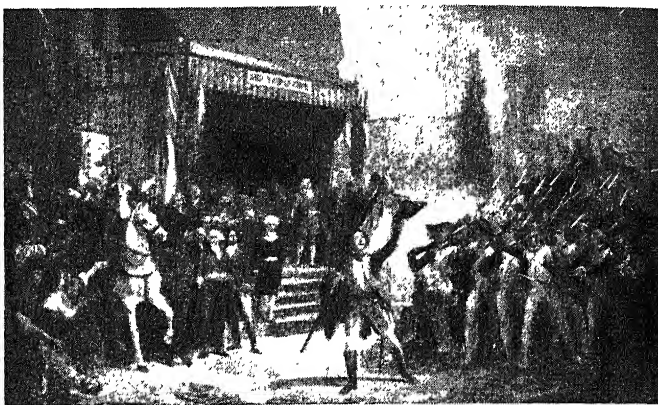
The immediate cause of the cataclysm was this financial chaos. The crushing burden of taxation and forced labour imposed upon the unprivileged classes, the obvious need for reorganization, the opposition persistently offered to any



French Revolution. The mob invading the Tuilleries palace in an attempt to intimidate the king and queen, June 20, 1792  
From a drawing in the Louvre, Paris

reorganization by the privileged classes, the disastrous failure of a succession of incompetent ministers to discover any remedy for the chaos, led to the suggestion that the Government should consult the nation by summoning an Assembly of the three estates, *noblesse*, clergy and commons, an obsolete form of a National Assembly which had not been called together for the best part of two centuries.

In Jan., 1789, the States-General was summoned. At the beginning of May it assembled, the Third Estate, or commons, appearing by its elected representatives, among whom were included a sprinkling of aristocratic sympathisers. It was apparent that, if the three estates voted as separate chambers, as the government intended, the two privileged chambers would be in permanent agreement, resolved to



French Revolution. Enrolling volunteers to serve in the Revolutionary armies

*From a picture by Finchon, at Versailles*

14 the mob marched upon the Bastille, the fortress-prison which

Armed Paris organized itself as the National Guard. The fall of the Bastille was hailed as typifying the fall of the old order. The National Guard was placed under the command of the popular nobleman Lafayette; it adopted the tricolour for its colours. All over the country mobs rose, and the down-trodden peasantry turned their fury upon the châteaux of the seigneurs, while payment of taxes was refused. The whole machinery of government had broken down, though some semblance of order was preserved by the efforts of the middle classes and by the organization in the provinces of National Guards after the Paris model.

On the other hand the king, Louis XVI, a man hopelessly lacking in insight, but with the best of intentions and abundant personal courage, won a moment's popularity by boldly presenting himself in Paris, obviously at the risk of



French Revolution. Roll call of the last victims of the Reign of Terror, 1794. The seated figure in the centre is André de Chénier, who wrote his most famous poems in the prison of Saint-Lazare

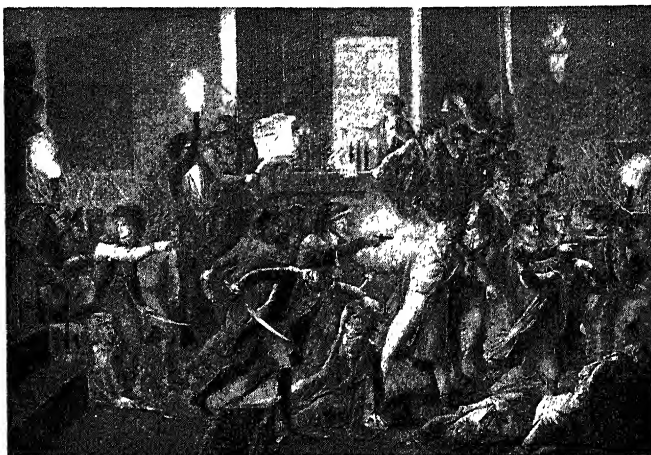
*From a picture by C. L. Müller, at Versailles*

surrender no fraction of the privileges which in their view constituted the safeguards of society. The voice of the Third Estate would count for nothing unless all the chambers voted together, giving the preponderant voting power to the preponderant numbers of the Third Estate.

This was the first battle-ground, and the fight was won by the Third Estate, led by the aristocrat Mirabeau. Its delegates assumed the title of the National Assembly, and were joined by many of the representatives of the lower clergy. The sympathies of the whole population of Paris and the whole rank and file of the soldiery were with them. An appeal to force was too dangerous to be attempted; the government gave way and the Estates were constituted as a single chamber.

The court sought to save itself and to overawe Paris by means of mercenary regiments, Germans and Swiss. Paris armed itself: on July

stood as the material embodiment of the old system, and stormed it.



French Revolution. The arrest of Robespierre amidst the turmoil and strife of the night of 9-10 Thermidor, 1794

*From a contemporary print*

his life, and mounting the tricolour cockade. Popular hostility, however, was directed not against him but against the arrogance and the privileges of the *noblesse*. These, the enthusiasts declared, were at the root of the woes of France; and on Aug. 4 the National Assembly decreed the abolition of the whole mass of the obnoxious privileges; after which it set about formulating a constitution, taking to itself the title of the Constituent Assembly.

While the Assembly continued its work of wholesale abolition and wholesale reconstruction, the king was kept virtually a prisoner in Paris; numbers of the nobility were fleeing or had already fled into a voluntary exile in the hope of eventually recovering their lost privileges by force; and outside the Assembly was organized the political association of reformers known as the Jacobin Club, which derived its name from its meeting place, the Dominican or Jacobin convent of the Rue S. Jacques. The club, affiliating to itself similar clubs all over the country, became a great political power.

#### Death of Mirabeau

It is conceivable that Mirabeau, if the court party had placed itself unreservedly in his hands, might have succeeded in effecting a reconstruction combining a monarchical executive with a democratic legislature, capable of providing a strong government with popular sympathies; but the court party had few ideas apart from striving to paralyse the activities of the Assembly, in which they were aided by the extremists of the other wing. The last chance, such as it was, perished with the death of Mirabeau on April 2, 1791. The king, finding himself helpless, resolved upon flight. He attempted to execute the design (June), but was detected and stopped at Varennes as he was nearing the frontier, and was brought back.

The flight to Varennes and the documents which Louis had left behind made it clear that the king was antagonistic to the constitution which had been designed, also that it was probable he would seek to evade it or overturn it. There was more than excuse for the suspicion that he and his wife, Marie Antoinette, if they had crossed the border, intended to appeal to the crowned heads of Europe and more particularly to the queen's brother, the emperor Leopold II. The *émigrés*, the fugitive *noblesse*, notable among whom was the king's brother, the count of Artois (afterwards Charles X), were already clamouring for armed intervention from abroad.

Leopold, in conjunction with the king of Prussia, issued the declaration of Pilnitz—a warning that the Powers could not recognize the existing French government until the reinstatement of the king, and threatening intervention should the Powers be unanimous—a perfectly safe threat, since Leopold knew that the Powers would not be unanimous. On the other hand, the declaration was calculated to silence the *émigrés*.

#### The Legislative Assembly

Meanwhile in France the more advanced democrats were calling for the deposition of the king, even for the declaration of a republic. Moderates like Lafayette, men who two years before had been regarded as the leaders of the advance guard, rallied to the monarchy and urged on the king the adoption of the constitution promulgated by the Assembly. His acceptance reinstated him as king, with limited powers. The constitution provided for the appointment of a new Legislative Assembly in which all members of the National Assembly were prohibited from sitting.

The members of the National Assembly had at least attained some experience of administrative functions; the members of the new Legislative Assembly were without experience at all, and were for the most part doctrinaire republicans. On the reinstatement of the monarchy the declaration of Pilnitz was withdrawn. But it had had a fatal effect upon which Leopold had not calculated. Its subtle intention was misunderstood in France, and it was regarded simply as an insolent attempt on the part of foreign Powers to dictate to France on a domestic question with which they had no concern.

In the Assembly there were three main groups besides the infinitesimal sprinkling of thorough-going royalists: the *Feuillants* or Constitutionalists, the Girondins, who came from the department of the Gironde and may be described as literary republicans; and the ultra-democrats, now identified with the Jacobins. The *Feuillants* and the Girondins were both disposed to adopt a highly aggressive attitude towards the foreign Powers and the *émigrés*. Louis found himself forced to discard his royalist ministers and put Girondins in their places. Though the Jacobins held aloof, for which the leaders outside, Danton and Robespierre and Marat, had their own reasons, Louis was compelled to declare war upon Austria at the moment when the emperor Leopold died

and was succeeded by Francis II (March, 1792).

Dumouriez, the new war minister, had again developed Louis XIV's conception that the borders of France should be extended to her "natural boundaries," the Rhine, the Alps, and the Pyrenees. Patriots hastened to join the as yet ill-organized armies on the frontiers. Ill-success was attributed to the aristocratic officers. Riots broke out in Paris, the mob invaded the Tuileries and insulted the king and the royal family. Prussia declared war in alliance with Austria. It must be remembered that at this time the Netherlands belonged to Austria, and the modern Belgian frontier was then the Austro-French frontier. The duke of Brunswick, on behalf of Prussia, issued a threatening manifesto which filled Paris with wrath. The Jacobins had captured the Commune (the government of Paris), and virtually dominated the Legislative Assembly.

#### The Victory of Valmy

The prisons were crowded with suspects, persons supposed to be under suspicion of collusion with the *émigrés*. The advance of the Prussians created a panic; there was a widespread belief that there was a royalist plot for a royalist insurrection in Paris. The Commune organized a visitation of the prisons, and in the September Massacres hundreds of captives were slaughtered. In a few weeks came the news that the Prussians had been checked in an engagement at Valmy. From that time the armies of the Republic habitually proved themselves more than a match for their enemies.

With the close of Sept. the Legislative Assembly gave way to a new National Convention, part Girondist, part Jacobin, and altogether Republican. It proceeded at once to declare that the monarchy was abolished and a Republic established, and all populations in districts occupied by French troops were proclaimed freed from the monarchies under which they were supposed to have groaned. The French Republic had assumed the character of an aggressive champion of the Liberty which it was determined to impose upon the peoples of Europe in a general war against monarchy. It clinched its position by repudiating treaties, finally challenging England by declaring the opening of the navigation of the Schelde and by throwing down the head of a king as its gage of battle to the kings of Europe. Louis was brought to a sort of trial, and was beheaded Jan. 21, 1793.

Then, while French armies were achieving successes against their enemies beyond the frontier, the parties in Paris fell to devouring each other. The Girondins had now become the party of moderation; the Jacobins won the supremacy, drove them from office, and sent many of them to the guillotine. A Committee of Public Safety was organized which wielded despotic power; its emissaries accompanied the armies, and were scattered all over the country, none daring to dispute their behests. While one of the members, Carnot, was sufficiently occupied as the war minister organizing victories, the Reign of Terror was instituted, and the guillotine devoured its victims in numbers that increased week by week from scores to hundreds. On July 13 Marat was slain by Charlotte Corday, but his death made no difference. The mere accusation of being well affected to the aristocrats was the almost un-failing precursor of imprisonment and death.

On Oct. 16, 1793, Marie Antoinette, the widow of Louis, who had died with kingly calm and dignity, followed her husband to the scaffold. A month later the guillotine claimed among its victims Marie Roland, the heroine of the Girondists. Day by day the tumbrils rolled through the streets of Paris; in the provinces scenes even more repulsive were enacted.

#### The Fall of Danton

Danton, the inexorable, who shrank from nothing when he deemed that the cause of Liberty would be furthered by frightfulness, sickened of the purposeless slaughter; even Robespierre was nauseated by the vulture flock that was headed by the detestable Hébert. Suddenly he turned on them, and on March 24, 1794, Hébert's own head fell. But Robespierre was minded for no more concessions to the indulgents, the group of whom Danton, weary of bloodshed, was the leader, his own ascendancy was at stake; on April 5 the great Tribune was struck down. But the carnival of blood was no longer to be endured. A conspiracy was organized. Suddenly, on July 27, Robespierre himself was seized, and on the following morning he was beheaded. With his death and the execution of his partisans which followed, the Reign of Terror was ended.

It remained to evolve one more constitution, a constitution which was to place the administration in the hands of a Directory of five, while legislation was to be en-

trusted to two Assemblies. This scheme, arrived at a year after the fall of Robespierre, did not command universal assent, especially in Paris. But the government were prepared for an insurrection, and when it came they had entrusted the arrangements for its suppression to a young officer of the artillery, Napoleon Bonaparte. His success was complete. The Directory was established by the *coup d'état* of Vendémiaire (Oct. 5, 1795) and Bonaparte was rewarded with the command of the armies of the Republic in N. Italy. Four years were to pass before another *coup d'état* made the young general First Consul, and in effect transformed the French Republic into a military monarchy. Not till 1871 was a republic to be permanently established in France.

#### Results of the Revolution

But the meaning of the French Revolution is not to be tested by its success or its failure in establishing republican institutions. Republicanism was only one of its accidents; the basic principles on which it rested are no less compatible with a constitutional monarchy than with a republic. Essentially, its political demand was for the "government of the people for the people by the people"; the movement assumed its terrific character because it arose when nearly all the peoples of Europe were governed mainly in the interests of particular classes by absolute rulers. It did not succeed in establishing anywhere the practice of "government by the people"; in Europe generally the force wielded by governments, not by the people, was too strong for them to be readily overthrown, and the actual excesses perpetrated in France checked for the time the moral forces which would naturally have been thrown into the scale on the side of Liberty. But a spirit had been aroused which, though it might be sternly repressed, could never again be completely allayed.

If the French people were still willing to submit themselves completely to a master who could be idealised as a hero, it had yet become impossible after the Revolution to lay upon them the old yoke, to subject them to the absolutism of an hereditary prince or the domination of an hereditary caste. Everywhere the Revolution forced upon privileged and unprivileged classes alike the consciousness that the unprivileged have rights which cannot altogether be ignored, that revolution will always lurk under

the throne of tyranny; the peoples of Europe owe it to the French Revolution that, however slowly, they have yet won in a greater or less degree a hearing for themselves in their own governments.

The French Revolution was the direct cause of the great movement which has turned South America into a group of self-governing states instead of a congeries of provinces administered as the estates of an absolute monarch. Politically, the feudal system of the Middle Ages had perished long before; as a social system it had remained rampantly dominant. As a social system the Revolution shattered it—utterly among the Latin peoples, though not so completely elsewhere. However we may shudder at the methods which the Revolution employed, at a time when elemental forces broke loose which no man could control, its fundamental principles have become part of the creed of civilized humanity.

THE WARS BEFORE NAPOLEON. France declared war on Austria April 20, 1792, and was fighting almost continuously against coalitions of enemies until 1815. About 1797 the campaigns merge into those of the Napoleonic Wars (*q.v.*). The incidents to that date may be briefly summarised.

#### Wattignies and Fleurus

At the cannonade of Valmy, Sept. 20, 1792, the French under Kellermann stood firm against the Prussians, who broke off the action. Slight as was this engagement, it is reckoned one of the world's decisive battles, for it made possible the whole Revolutionary achievement. Dumouriez invaded the Netherlands and won a victory at Jemappes, Nov. 6. Great Britain and Spain joined Austria and Prussia, and the French were badly beaten at Neerwinden, March 18, 1793. But the situation was restored in the summer from the Channel to the middle Rhine, principally by the organization of Carnot and the leadership of Jourdan, who won the tremendous battle of Wattignies, Oct. 14-16. Next year brought advances in the Netherlands and a great victory at Fleurus, June 26. Then Pichegru and Moreau won reputations on the Rhine, while Bonaparte was learning his craft in N. Italy. The inter-action of military and domestic events in French politics presents a tangle that is fascinating but too intricate for the scope of a short article.

*Bibliography.* The French Revolution, T. Carlyle, 1837. The Revolu-



lutionary and Napoleonic Era, J. H. Rose, 6th ed. 1907; The French Revolution, H. Belloc, 1911; The French Revolution, L. Madehn, Eng. trans. 1916.

**French Union.** Term used in the French constitution of 1946 for a political union composed, on the one hand, of the republic of France, i.e. metropolitan France and overseas departments (e.g. Martinique, Guadeloupe, French Guiana) and territories (e.g. French West Africa, French Somaliland); and, on the other, of associated territories (Morocco, Tunisia), and states (Vietnam, Laos, Cambodia). A high council was set up composed of delegates of the French govt. and of the associated states; and an assembly, of which half the members represented metropolitan France, the other half overseas depts., territories, and associated states. Complete independence was accorded to the associated states in 1954, to the territories in 1956.

**Frensham.** Village and parish of Surrey, England. It is 3½ m. S. of Farnham, and is noted for its two lakes or ponds. The larger of them covers 90 acres and is visited for boating and fishing.

**Frequency** OR PERIODICITY. The number of complete cycles or double reversals per second of any vibrating quantity, e.g. an alternating electric current or a vibrating tuning fork. In radio waves it varies from ten to many millions. Its value for the musical note middle C is 256 per sec. The frequency of the commercial A.C. supply is 50 c.p.s. in the U.K., but 60 c.p.s. in the U.S.A.

**Frequency Modulation.** System of radio transmission in which intelligence is conveyed by causing the frequency of oscillation of the carrier wave to deviate from its steady unmodulated value by amounts depending upon the strength of the modulating sounds. This is in contrast to the usual method of amplitude modulation (A.M.), in which the frequency of the carrier is constant but its strength is made to vary proportionally to that of the modulation. Frequency modulation (F.M.) simplifies the design of the transmitter, since the power output is constant; in an A.M. transmitter the circuits may be called upon to handle powers varying from zero to four times the average unmodulated power. The F.M. transmitter is less subject to distortion from over-modulation.

Since the output from the receiver is governed primarily by

changes of frequency in the incoming wave, it is feasible to use a "limiter" to keep the amplitude of the input to the receiver constant and so smooth out superimposed noise fluctuations. Impulsive interference such as that arising from the ignition of motor cars is not completely eliminated, but the background noise in a properly designed F.M. receiver is far lower than in a comparable A.M. receiver. Residual noise in the F.M. receiver is high pitched by comparison with that in the A.M. receiver and can be still further reduced by a process of "pre-emphasis" and "de-emphasis." At the transmitter the high-frequency components of the sound modulation are increased artificially according to a known ratio. Complementary reduction at the receiver restores the balance of tone, but at the same time depresses the high-frequency components of the noise.

In the U.S.A. F.M. operates on ultrashort waves. Channels 200 kc. wide have been allotted and the carrier swing limited to 150 kc. This permits transmissions of audio-frequencies up to 15,000 kc. to be transmitted, as against the usual maximum of 5,000 kc. for A.M. Thus, in practice F.M. offers higher fidelity as well as greater freedom from extraneous noise.

**Frere, Sir Henry Bartle Edward** (1815-84). British administrator. Born at Clydach,



Sir Bartle Frere, British administrator

Brecknockshire, March 29, 1815, and educated at Bath grammar school and Haileybury, he entered the Bombay civil service in 1834. For his services during the Indian Mutiny he was created K.C.B. He was governor of Bombay 1862-67, and received a baronetcy in 1876. He was sent out in 1877 as governor of the Cape and high commissioner for the settlement of native affairs in S. Africa, with a view to the confederation of the colonies; but his action in relation to the Zulu War was censured by the government, his conduct was violently assailed by Gladstone in the Midlothian campaign, and Frere was recalled in 1880. His justification is contained in his Correspondence relating to the Recall of Sir Bartle Frere, 1880, and in Afghanistan

and South Africa: a Letter to the Right Hon. W. E. Gladstone, 1881. He died May 29, 1884, and was buried in S. Paul's Cathedral. *Consult* Life and Correspondence, J. Martineau, 1895.

**Frere, John Hookham** (1769-1846). A British diplomatist and translator. Born in London, May 21, 1769, eldest son of John Frere (1740-1807), the antiquary, he was educated at Eton, where he began his friendship and literary collaboration with George Canning, and at Caius College, Cambridge. He was M.P. for West Looe 1796-1802; foreign under-secretary, 1799; envoy to Lisbon, 1800-02; minister at Madrid, 1802-04; privy councillor, 1805; and minister to Spain again, 1808-09, being recalled after the retreat of Moore to Coruna. He settled in 1818 at Malta, where he died, Jan. 7, 1846.



John Hookham Frere, British diplomatist. After J. Hopper

Frere, who twice refused a peerage, as a writer sought more the critical approval of the few than the applause of the public. At Eton he joined in promoting *The Microcosm*. He was one of the founders of *The Quarterly Review*. His pungent wit and metrical facility show to advantage in his renderings of *The Acharnians*, *Knights*, *Birds*, and *Frogs*, of Aristophanes, 1840. Byron was indebted to him for the *ottava rima* of Beppo.

**Fréron, Louis Marie Stanislas** (1754-1802). French journalist, born in Paris, Aug. 17, 1754. A friend of Robespierre and Desmoulins, he founded during the Revolution the violently republican paper, *L'Orateur du Peuple*; but later he became leader of the reactionary *Jeunesse Dorée*, causing the downfall of Fouquier-Tinville, the public prosecutor. After attempting to marry Pauline Bonaparte, Fréron in 1799 became commissioner at Santo Domingo (now Ciudad Trujillo), where he died.

**Fresco** (Ital., fresh). Method of painting in water colour upon fresh mortar. It was the favourite process of mural decoration before the introduction of oil painting. The plaster must be fresh in order to absorb the colour, and since it dries rapidly, the artist must work with great dexterity, decision, and speed. The wall must be free of saltpetre, and only such colours can be



employed as are not affected by lime—a limitation which excludes certain of the most brilliant greens, reds, and yellows.

The artist first of all drew a cartoon (*q.v.*), and then transferred it piecemeal to as much fresh plaster as he could cover “at a sitting.” The palette was dispensed with because it could not hold enough colours, and pots of different colours were used instead. Though regarded as a process of water colour painting without agglutinants, size, or white or yolk of egg was required to fix certain colours. Theoretically, fresco should last as long as the wall which it adorns, but meteorological conditions are vital, a damp climate being fatal. *See* Painting.

**Freshfield.** Cape or promontory on the coast of King George V Land (*q.v.*), Antarctica. It is in lat. 68°–69° S., and long. 151° E., and separates Cook Bay from Deakin Bay. Discovered by the Mawson Expedition of 1911–14, it was named after the English explorer and mountaineer, D. W. Freshfield.

**Freshwater.** Parish, village, and resort of the Isle of Wight, England. It stands on the river Yar, 1½ m. S. by W. of Yarmouth. Its parish church, on the site of an older edifice, retains a Norman doorway, a 12th-century arcade, and a memorial brass of 1390, Lady Tennyson, wife of the poet, was buried here. The chalk and flint cliffs between Freshwater Bay and the Needles (chiefly National Trust property) reach a height of nearly 500 ft. Farringford House, once Lord Tennyson's home, later an hotel, is near by. An obelisk on High Down commemorates Tennyson. Pop. (1951) parish, 3,423.

**Fresh Water Deposits.** Sedimentary rocks which can be definitely identified as having been laid down in fresh water, such as lakes, by their containing fossil remains of fresh water organisms. The term is used mainly in contradistinction to deposits of marine (sea water) environment. The Old Red Sandstone of Devonian age are largely of this type. Fresh water beds are represented in S.E. England in the Purbeck and Walsden Beds of the Jurassic and Cretaceous systems. Part of the Oligocene Beds of the Isle of Wight

are also of fresh water origin. Many fossil organisms found in past fresh water deposits bear resemblances to types living today under similar conditions.

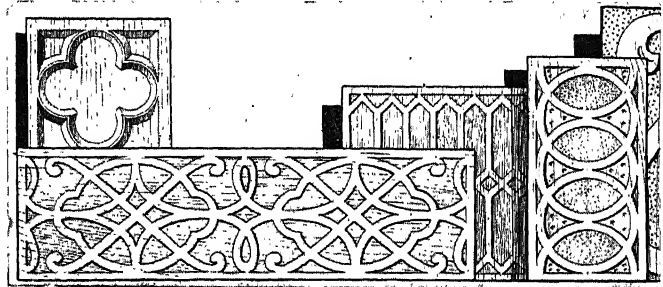
**Fresnel,** AUGUSTIN JEAN (1788–1827). French physicist. Born at Broglie May 10, 1788, he worked first as an engineer, and later made researches in optics, doing valuable work in connexion with the undulatory theory of light. He deduced the mathematical results of Thomas Young's experiments, and explained the interference of polarised as well as ordinary light. He died July 14, 1827.

**Fresnillo.** Town of Mexico, in the state of Zacatecas. It stands on the slopes of the Cerro del Proaño, about 7,000 ft. above sea-level, and is 36 m. N.W. of Zacatecas by the Mexican National Railroads. The chief industry is

neighbourhood, which produces grain, grapes, figs, peaches, and apricots. Petroleum is obtained, and mining and stock-rearing are carried on. Fruit drying and packing is an industry, while there are foundries, potteries, and brickworks. Founded in 1872, Fresno received a city charter in 1885. Pop. (1950) 91,669.

**Fret.** In heraldry, masele interlaced by a cotice and a baton. A shield fretty is covered with a trellis or interlaced diagonal bands. The trellis may be nailed or cloué. *See* Ordinary.

**Fret.** Little ridge upon the fingerboard of some stringed instruments to mark the point at which the player's finger must shorten the vibrating length of string to produce a certain note. On the violin and its larger relatives the fingerboards are plain



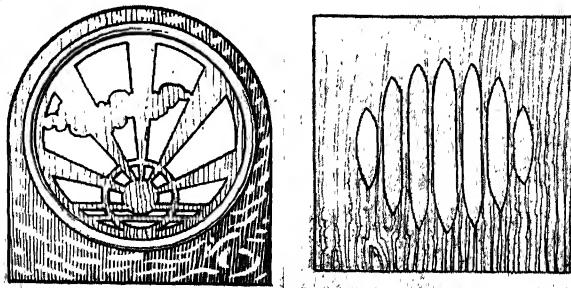
**Fretwork.** Designs showing how carved work may be imitated by the use of a fretcut overlay

the working of the silver and copper mines, discovered in the middle of the 16th century. Agricultural pursuits and stock-rearing are engaged in.

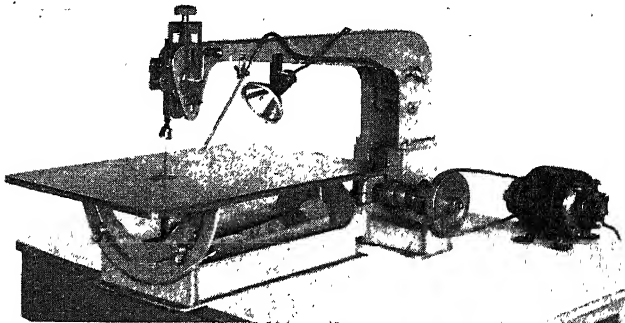
**Fresno.** A city of California, U.S.A., the co. seat of Fresno co. It lies in the valley of the San Joaquin in the centre of the state, 200 m. S.E. of San Francisco, and is served by the Atchison, Topeka, and Santa Fé and the Southern Pacific rlys. and an airport. Irrigation is largely resorted to in the

and the player's sense of position and pitch is his sole guide; but the older viols had fretted fingerboards as have also the popular plucked instruments such as the lute, mandolin, guitar, and banjo. *See* Fingerboard.

**Fretwork** (O.F. *frete*). Woodwork or metalwork, fenestrated by sawing in ornamental design, and usually thin in substance. Frets were used in early clock-cases to allow for the more full escape of the sound of the chiming or striking gear. In the 19th century piano panels were fretted for a similar purpose, and today frets are used on radio sets and loudspeakers. In the Chippendale period the tops of afternoon tea or coffee tables were often edged with frets to afford protection to the silver and china, the design being some-



**Fretwork.** Typical designs for frets which are suitable for loudspeakers or gramophone cabinets



**Fretwork.** Fretsaw driven by a small motor, as used for industrial purposes  
By courtesy of Hobbies

times extended to underframing. Today fretwork design without functional purpose is regarded as redundant, on account of the necessary dusting. Period pieces with frets are in small demand.

Amateur fretwork became popular from 1870. Small articles such as pipe racks were made. Light shelves were fretcut on the back edges to form tenons, which fitted into counterpart fretcut mortises. As time proceeded fretcutting be-

came a boy's hobby. In industry, the fretsaw is worked by power, though there are also treadle machines. The hand fretsaw is the shape of a long U, the saw being sprung between the open end, the handle in line with the saw. In all cases fretcutting is done on a "table." A hole is bored in the work, through which the saw is passed, after which the saw is adjusted. Fine wooden frets are stronger when made in plywood.

## FREUD AND FREUDISM

**Amber Blanco White.** Lecturer on Moral Science, Morley College  
*Some account of the theories developed by the Viennese doctor who revolutionised the approach all over the world to the care and cure of illness of the mind. See also Psychiatry; Psycho-analysis; Psychology, etc.; and entries such as Dream; Pleasure Principle; Super-Ego; Unconscious, etc.*

Sigmund Freud was born at Freiberg in Moravia, May 6, 1856. Of Jewish descent, he was educated in Vienna



**Sigmund Freud,**  
Austrian scientist

until he went to Paris to study nervous disease under Charcot. He returned to Vienna, where he became a professor of neurology and divided his

time between teaching, the cure of mental illness, and research in the field of psychology. When Germany annexed Austria in 1938, he was allowed to come to London, where he was made a Fellow of the Royal Society. He was ill and the roll of the society was brought to him at his house for signature—an honour paid hitherto only to a reigning monarch. He died in London, Sept. 24, 1939.

His discoveries were unexpected, varied, and far-reaching. He found psychology still a branch of philosophy, it experimental side concerned either with the borderland between psychology and physio-

logy, or carried out by introspection. He left it a connected whole, with the main features of the geography of the human mind mapped, including the hitherto hardly suspected pre-conscious and the unconscious. He traced several aspects of the growth of the individual from infancy to maturity, and showed how inherited qualities develop through interaction with environment. Possibly Freud's most important contribution in this field was his account of how conscience (the super-ego) is formed from primitive fears, and the rôle that it comes to play in the life of man.

### Development of the Sexual Life

Perhaps of equal value was his work on human instinct and the formation of character. The aspect of this part of Freud's work which has had the greatest influence is his analysis of the sexual instinct. He realized that sex, in its mature or genital form, does not appear out of nothing at puberty, but is built up from components found in early childhood. Evidence for this theory can be found by anyone capable of observing children dispassionately; but it was received

with a storm of abuse, and is still a serious obstacle to the acceptance of his doctrines. His second thesis in this sphere was that all friendly, loving, social impulses depend finally upon the healthy development of the sexual life—a doctrine equally unpopular and with equally important moral implications. His general theory of instinct, however, is not generally accepted even by his followers.

In the narrower field of medicine, Freud's work changed the whole approach to the study of mental illness. For the first time its causes were uncovered, its symptoms—thought hitherto to be a mere inexplicable confusion—given meaning, its forms distinguished, and its lines of development plotted. He also introduced a technique for exploring those regions of the mind in which the origins of mental disease lie hidden, and a method by which many illnesses and defects of personality may be cured; and he carried out wide research into particular forms of mental abnormality.

### Nature of the Mind

His theories of the nature of the mind give a meaning to dreams, and explain the unconscious forces which find expression in the customs of savages, in wit and humour, literature and art, and in many of the acts performed and opinions held in everyday life.

He saw the human mind as an organized system of actions and reactions linked together by cause and effect, none of them inexplicable given sufficient data, none the result of mere chance or of supernatural phenomena. Freud believed that a close and constant connexion exists between mental and bodily processes, though he did not attempt to describe its nature. Starting from this basis, he conceived of man as governed from birth by two sets of opposing forces—his endowment of inherited instincts and tendencies, and the demands made upon him by his environment. The instincts seek expression; the environment often prevents or limits this. The child, according to Freud, deals with the situation in various ways. He seeks pleasure and avoids pain, escaping from some of the disagreeable aspects of reality by fantasy and wishful-thinking or by throwing the blame for his actions on to the external world. The child is also endowed with curiosity, which leads him to test reality, including his own body, which has to be distinguished from the external world. As a result of this testing

he learns from experience, and achieves the power to reason, which enables him in increasing measure to delay and control his responses to instinct and take probable results into account. Freud held that reason should be the over-riding arbiter of conduct in the adult.

#### Children and Parents

While the child is thus learning to adapt himself, his emotional life is developing. He is learning to transfer love from himself to objects which gratify him—e.g. his mother—and is developing hostility whenever his aggression (power of making efforts) is thwarted. The most disturbing of the forces which thwart him are the adults who care for him, both because he is completely dependent upon them and because they can show disapproval and anger. As a result, fear is attached to impulses whose indulgence produces unpleasant reactions on the part of parents, and to the child's own hostile feelings. This fear is the seed of conscience, whose function is to control forbidden impulses and to warn child and man against them by flooding the mind with consequent anxiety.

While conscience is developing, the child is acquiring his notions of right and wrong from the behaviour of his parents, who seem to him, at this stage, omnipotent and omniscient. This view of the parents, especially the father, is later transferred to a divine father, or god, where this conception is accepted. It is also sometimes attached to personalities regarded as heroes.

#### Repression and Conscience

With conscience appears another mechanism—that of repression. This shields the conscious mind from the reproaches of the super-ego. When more fear is felt—either of real danger, or of being wicked and destructive—than can be tolerated, it is thrust down into the unconscious mind. When this happens the repressed material—which may include in extreme cases all memory of the event that caused the fear—become inaccessible both to ordinary knowledge and to the operations of reason, and can be rediscovered only by such methods as hypnotism and free association. Nevertheless, though sealed away from attention, it is neither inactive nor unimportant. Experiences similar to those which caused the first repression will revivify the memories and feelings connected with it so that they strive to return to

consciousness. But so long as the super-ego brands them as dangerous they will succeed in doing this only in disguised forms whose connexion with their sources is not realized. For example, an unconscious desire to steal may appear as anger with those who "leave their money lying about." Again, repressed hatred of one's father often becomes hatred of all those who seek to impose authority—employers, the government, etc. In this way repressed material exerts a continuous and powerful influence both on beliefs and on much of human conduct. When, owing to the acute or massive nature of the fear felt, simple repression fails to achieve its purpose, either a neurotic symptom will appear or the mind may withdraw itself from reality. Many traits of character are developed as a defence against anxiety due to repressions.

#### Danger of Excessive Anxiety

Before these mental distortions can be straightened out, it is necessary first to restore the direct connexion between their repressed causes and the rest of mental life and then, by removing the excessive anxiety, to enable the patient to take a reasonable view of his own past behaviour.

Freud's picture of the human mind, therefore, is one of continual even if largely unrecognized conflict—conflict between inherited tendencies and the demands of society as conceived by the individual, between repressed material and the forces which keep it out of consciousness, between all the irrational elements in the mind and that reason which should be their master.

**Bibliography.** Works by Freud: *Studies in Hysteria* (with Josef Breuer), 1895; *The Interpretation of Dreams*, 1900; *Psychopathology of Everyday Life*, 1901; *Totem and Tabu*, 1913; *Introductory Lectures in Psycho-Analysis*, 1917; *The Ego and the Id*, 1923; *Autobiographical Study*, Eng. trans. 1935; *Letters*, 1954. *Consult also* *Life and Works*, Ernest Jones, 3 vols., 1953–57.

**Freyberg, Sir Bernard Cyril Freyberg, Baron** (b. 1889). British soldier and administrator. Born in London, educated at Wellington College, N.Z., he returned to England at the outbreak of the First Great War during which he served at Antwerp, in Gallipoli, and in France, was nine times wounded, and was awarded the V.C. and the D.S.O. with two bars. In 1919 he was made C.M.G. He joined the regular army, commanded the 1st Bn., Manchester Regt., 1929–31,

held staff appointments and commands, and retired in 1937.

In 1939 Freyberg returned to the active list as G.O.C. Salisbury



Lord Freyberg, V.C.,  
British soldier

Plain Area before his appointment as leader of the New Zealand expeditionary force. On May 5, 1941, he became Allied c.-in-c. in Crete to superintend the evacuation.

He served with the 8th army throughout the N. Africa campaign and in Italy, commanding the N.Z. 2nd division which distinguished itself at Cassino and elsewhere. He was promoted to lieutenant-general and awarded a third bar to his D.S.O. He retired from the army owing to disability. Governor-general of New Zealand 1946–52, he returned to England at the end of his period of office. He was created K.C.B. and K.B.E. in 1942, and a baron in 1951.

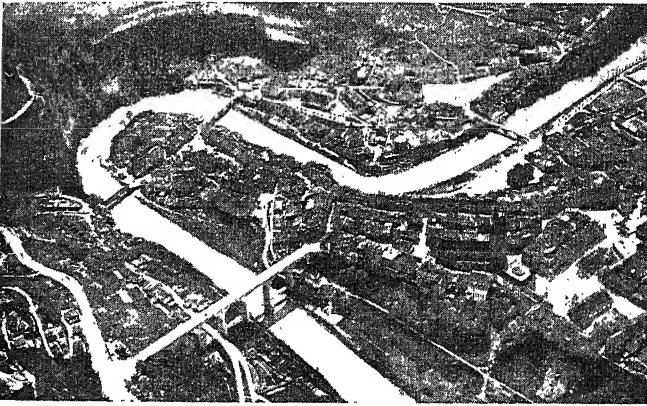
**Freyer, Sir Peter Johnston** (1852–1921). British surgeon. He specialised in affections of the bladder, and was the originator of the operation with which his name is connected. He died Sept. 9, 1921.

**Freyja.** Goddess of love and healing in Norse mythology. Two white cats drew her chariot and she could fly in a magic feather skin. Her house in Asgard was Folkvang, where she received the souls of half the slain from Odin.

**Freyr or Frey.** Norse god of rain, sunshine, and fruitfulness, especially worshipped in ancient Sweden. Brother of Freyja, he owned the Sword of Victory and Skidbladna, a ship which could carry all the gods and yet be folded into his bag. He gave away the sword to win Gerda, a giant maiden, and thus was conquered. His house in Asgard was Alfheim.

**Friar** (Fr. *frère*, brother). Term applied to members of the mendicant orders of the Roman Catholic Church. These have included Franciscans, 1209; Dominicans, 1216; Carmelites, 1210; Augustinians, 1256; Servites, 1233; Trinitarians, 1198; and Crutched or Crossed Friars, 1169.

**Friar's Balsam.** Compound tincture of benzoin. Various suggestions have been advanced to account for the still popular name of this preparation. It was mentioned in the schedule to the Medi-



Fribourg. Air view of this important town in Switzerland showing the bridges over the Sarine river

cine Stamp Act of 1812, which suggests that it was regarded as a proprietary medicine. Possibly a Portuguese merchant, Peter de Frias, who in 1581 obtained the fruit of a balm or balsam from the viceroy of Peru, may have been the originator of friar's balsam. A patent medicine called "friar's drops" was sold in 1777. The compound contains benzoin, aloes, storax, balsam of tolu, and alcohol.

**Friar Tuck.** Character in the stories associated with Robin Hood. He is described as chaplain to the outlaw. In the old-time morris dance of the May games he attended upon Robin and Marian, the King and Queen of the May.

**Fribourg or Freiburg.** Canton of W. Switzerland. It is S.E. of and in parts touching Lake Neuchâtel. Area 645 sq. m. Chiefly in the basin of the Aar, it is watered by the Sarine with its tributaries, and the Broye. Undulating in parts, it is hilly in the S.E., where it impinges on spurs of the Bernese Alps, which rise to 8,000 ft. Mainly pastoral, it is noted for its cattle and Gruyère cheese. French is generally spoken; German in the N.E. section of the canton. Timber and tobacco are produced, paper and watches are made, and there is a chocolate factory at Broc. A R.C. stronghold, Fribourg has many convents; the capital (*v.i.*) is the only town of importance. Seven members are sent to parliament. Pop. (1950) 158,695.

**Fribourg.** Town of Switzerland, capital of the canton of Fribourg, and chief R.C. centre of Switzerland. It stands on the river Sarine, 20 m. by rly. S.W. of Berne. A lofty suspension bridge spans the river at the confluence with the Gotteron stream. The Sarine cuts the town into two parts, that on

the W. side standing on level ground, and the other among rocks and hills. The 13th century church of S. Nicholas is famed for its fine organ and its 15th century belfry. Fribourg possesses a town hall, a new R.C. university, college, lycée, several libraries, and a museum of fine arts. Tobacco, pasteboard, leather, and art objects are manufactured. The town was founded in the 12th century. After its liberation from the Hapsburgs and Savoy, it joined the confederation in 1481. It was taken by the French in 1798. Pop. 26,045.

**Frick, Wilhelm** (1877-1946). German politician. He was born at Alsenz, Palatinate, March 12, 1877, and educated at Munich, Göttingen, and Berlin universities. A magistrate in Bavaria, Frick illegally joined the National Socialist party and took part in Hitler's unsuccessful "putsch" of 1923. He was the first Nazi to become a minister when he received the portfolio for the interior in Thuringia, 1930. Reich minister of the interior from 1933, Frick was the last Nazi protector of Bohemia and Moravia from 1943. He was captured near Munich by U.S. troops, March 5, 1945; tried as a major war criminal at Nuremberg; found responsible for laws suppressing Jews, trade unions, and the press; and executed, Oct. 16, 1946.

**Frick Collection.** Art gallery in New York founded by Henry Clay Frick (1849-1919), who had acquired a fortune in enterprises concerned with coal, steel, and railways. He bequeathed to the public his mansion, with an endowment and a collection of art treasures. This consists principally of 14th to 19th century paintings, representing British and Continental masters. It also includes

bronzes, portrait busts, Limoges enamels, porcelains, and period furniture. An oak-panelled library is hung with portraits and landscapes of the English school. A drawing-room contains French 18th century furniture, with wall panels by Fragonard. A reproduction of an 18th century boudoir is decorated with panels by Boucher for Mme. de Pompadour.

**Friction.** Resistance offered by one body to motion over another. As an example, consider a body resting on a table. It requires a certain force to move it along the surface of the table, and also to keep it moving. The magnitude of this force depends upon two things: (1) the material of which the substances are made, and (2) the normal pressure between the touching surfaces. In 1781 C. A. Coulomb pointed out that the friction was independent of the velocity with which the surfaces moved over one another. Though his statement is now known to be inaccurate, it is, nevertheless, true for all ordinary velocities, though friction increases when bodies are moving very slowly over one another, and decreases when they are moving very rapidly. Friction between two bodies is greatly decreased by the use of lubricants.

It is easier to keep a body moving on a surface than it is to start it moving, and it follows that what is known as static friction, *i.e.* friction at rest, is greater than kinetic friction, or friction of motion. If  $F$  is the frictional resistance when a body is on the point of sliding along a given surface, and  $R$  is the perpendicular force between the body and surface at the point of contact, then the coefficient of static friction is given by the ratio  $F/R$ . The dynamic or kinetic coefficient is given by  $F'/R$  where  $F'$  is the frictional resistance when steady sliding is taking place. There is a third type of friction usually recognized. When a wheel or cylinder rolls on a surface, there is resistance to motion at the point of contact, called rolling friction.

Without friction it would be impossible to walk, drive a tram along ordinary rails, etc., and all movement would have to be by the use of cogwheels or some similar arrangement. The frictional forces brought into play by relative motion between portions of the same medium are spoken of as viscous forces. See Force.

**Friday.** Sixth day of the week. The name comes from Frigg, later identified with Freyja (*q.v.*). The name corresponds to Lat. Dies

Veneris, day of Venus (*cf.* French *vendredi*). The day is regarded as unlucky from its connexion with Christ's crucifixion, which is specially celebrated on Good Friday (*q.v.*). In the Roman Catholic church it is a day of abstinence, except when Christmas falls on that day. Friday is the Mahomedan sabbath. The epithet Black is given to various disastrous Fridays, *e.g.* May 11, 1866, when the failure of the banking house of Overend, Gurney & Co. caused a financial panic. Fridays in ember weeks are called Golden Fridays.

**Friday.** Character in Defoe's novel Robinson Crusoe (*q.v.*). A savage rescued by Crusoe from the cannibals about to sacrifice him, he is named from the day on which he was so rescued, and becomes Crusoe's servant.

**Frideswide.** English abbess and patron saint of Oxford. According to tradition, she was the daughter of Didan, viceroy of Oxford under Ethelbald, and Saxfrida his wife. She made a vow of chastity, and her father built and made over to her a church at Oxford, in connexion with which she founded a nunnery, and became herself its first abbess. Persecuted by a Mercian noble named Algar, she took refuge for a time at Binsey, where she built an oratory. After her death, in the latter half of the 8th century, her shrine became a centre of devotion, as did the well at Binsey, which is said to have originated in answer to her prayers. Her remains are believed to rest in Christ Church Cathedral, where a chapel is called after her.

S. Frideswide's nunnery was taken over by Austin Canons in 1004, and suppressed in 1525 by Wolsey, who replaced it by Cardinal College. Frideswide was canonised in 1481 and has been regarded as Oxford's patron saint since 1180, her festival being kept there on Oct. 19. In addition to the church at Oxford, 1870-72, churches at Frilsham (Berks), Poplar, and at Borny, near Boulogne, are dedicated to her. *See* Christ Church; Oxford; *consult also* The Story of S. Frideswide, F. Goldie, 1881.

**Fridtjof Nansen Land.** This is another name for the Arctic archipelago of Franz Josef Land.

**Friedland, BATTLE OF.** Victory of Napoleon over the allied Russians and Prussians, June 14, 1807. The failure of Murat's attack on the Russian entrenchments at Heilsberg, June 10, de-

termined Napo'eon to march on Königsberg. Bennigsen resolved to thwart this plan, and early on June 14 met Lannes' corps at Friedland, on the river Alle, 26 m. S.E. of Königsberg. Owing to Lannes' stubborn resistance, Bennigsen could do no more than cross the Alle and hold him in check until the arrival of Napoleon. The Allies were now in a serious position. Behind them, in an irregular arc, lay the Alle, across which their only line of retreat lay over the bridges of Friedland.

The battle began at 6 p.m. Ney was ordered to attack Friedland, but his advance was checked by a furious charge of the Russian cavalry. Victor was hurried to his assistance, and an artillery concentration turned on the Russians, which, seconded by an irresistible dragoon charge, turned the tide of battle. A rout ensued, and the Russians, pursued by Ney, fled through Friedland and across the river. The numbers engaged were: French, 70,000, and Allies, 55,000. The Allies lost 20,000 killed and wounded, the French little over 9,000. On July 7 Napoleon met the tsar Alexander on a raft in the middle of the Niemen, and the treaty of Tilsit was concluded.

**Friedrichshafen.** Town of Württemberg-Hohenzollern, Germany, on the lake of Constance. It has a harbour on the lake, built by Frederick I. king of Württemberg, who gave the town its present name. The chief building is the palace, formerly used by Kaiser William II. It stands in wooded grounds to the W. of the town, and has an interesting chapel.

There are a 20th century Rathaus, a fine rococo church (1695), and a meteorological station. Friedrichshafen was a tourist resort, and steamers went from here to various places on the lake, but after 1918 its main interest was as a Zeppelin depot. In the workshops here the dirigibles, later sea planes and aeroplanes, were put together; over the lake they made their trials; for their reception were numerous hangars, bombed by Allied aircraft in both Great Wars. The building of boats and the making of motorcars and aero-engines were other industries. The French entered the town during the Second Great War on April 29, 1945. It was in the French zone of occupation after the Allied conquest of Germany. As Buchhorn, the town had a Benedictine monastery, and was a free city from 1275. Pop. 11,290.

**Friedrichsruh.** Manor and village of Schleswig, Germany, 10 m. S.E. of Hamburg. Here was Bismarck's residence, and here he died July 30, 1898, and is buried in the mausoleum. The place is surrounded by the huge Saxon forest. The castle was damaged during the Second Great War.

**Friedrichsthal.** Mining town in the Saar district of Germany, 11 m. N.E. of Saarbrücken, with which it has rly. connexion. Here are large industrial plants. Pop. 16,400. Many other German places bear this name, which means Frederick's valley.

**Friendly OR TONGA ISLANDS.** Group of islands in the S. Pacific Ocean, a British protectorate from 1900. The kingdom, consisting of three groups of islands—Tongatabu, Haabai, and Vavau—and the outlying islands of Niutobutabu, Taofahi, and Niuafo, lies between lat. 15° and 23° 30' S. and long. 173° and 177° W. It is administered by a British high commissioner, with the assent of the sovereign and native chiefs. The islands are partly of volcanic and partly of coral formation, and only one-fifth of the 150 are inhabited. The people are fair Polynesians. Area, 269 sq. m. The capital is Nukualofa on Tongatabu. The produce consists of copra, mats, and green fruit. Pop. (est. 1954) 54,300.

The Friendly Islands were so named by Cook in 1773, on account of the courteous behaviour of the inhabitants. Tasman first touched here in 1643. There are numerous reefs and shoals around the islands, which abound in coconuts and a kind of fig tree. There is steamer and air connexion with New Zealand via Fiji. British and Australian coin is legal tender. The state church is Wesleyan. Salote, the queen, succeeded on April 5, 1918; she was made G.C.V.O. and G.B.E.

**Friendly Society.** Organization for the payment of benefits to its members through funds mutually subscribed. Local friendly societies giving sick pay and paying funeral costs sprang up all over England during the 18th century. The first Act for the encouragement of friendly societies was passed in 1793. Subsequent Acts governing their organization were consolidated in the Friendly Societies Act of 1896, amended 1908.

The early friendly societies suffered from having no legal status, no limitation of liability, and no actuarial background to

guide them in assessing contributions and benefits. Their close association with trade unions placed them in real danger of being suppressed under the Combination Acts of 1799 and 1800, as being seditious. As recently, even, as 1834, six men were sentenced to seven years' transportation for forming a friendly society for agricultural labourers.

The rapid growth of these societies, to be compared with that of trade unions, cooperative societies, building societies, and savings banks, was a practical expression of the desire of working men to secure themselves against distress caused by sickness and death. The early friendly societies, like some of the early trade unions, adopted mystic rituals of the kind usually associated with freemasonry. The large and successful orders which grew up, among them the Independent Order of Odd-fellows, the Ancient Order of Foresters, the United Ancient Order of Druids, and the Grand United Order of Oddfellows, provide a mass of statistics which, summarised first in the Ratcliffe Tables, and later in the Watson Tables, laid the foundation of actuarial science, and formed the working basis of later national insurance schemes.

#### Agents for National Insurance

Friendly societies were among the bodies which, as "approved societies," were made agents for the administration of the National Insurance Act of 1911. Their importance in this scheme is illustrated in the following classified figures of members of approved societies from the fourth valuation:

	Members
Friendly Societies ..	5,500,000
Industrial Insurance and Collecting Societies .. ..	4,460,000
Trade Unions .. ..	1,180,000
Employers' Provident Funds .. .. .	80,000

The National Insurance Act of 1946, which transferred the administration of health insurance entirely to the state, ended the participation of the friendly societies in national insurance.

The alongside table gives the statistics of societies registered in 1944 under the Friendly Societies Acts.

Societies registered under the Friendly Societies Acts enjoy many privileges—they have important exemptions from income tax; they have a clearly defined legal status; they may hold land and own property, and sue in their own name; they have limited liability.

and members may transfer without making a will sums up to £100 payable at death, and themselves insure for sums not exceeding £300. In return, such societies must submit rules for the approval of the registrar; appoint trustees; submit audited accounts to the registrar annually, and hold revaluations of assets not less frequently than once every five years. The office of the Registrar of Friendly Societies, who will give information, statistics, and advice about them, is 17, North Audley Street, London, W.1.

**Friends, SOCIETY OF.** The religious body commonly known as Quakers is described under Society of Friends.

**Friends of the People.** Society formed in England in 1792 by some of the more advanced Whigs to bring about parliamentary reform. Sir Philip Francis was one of its founders and helped to draw up its original programme. The members were influenced by the French Revolution but proposed to proceed by constitutional means. The society had a short life.

**Frieze Greene, WILLIAM.** See Greene, William Frieze.

**Friesland.** A north-eastern province of the Netherlands. The Yssel Lake (the remains of the former Zuider Zee) and North Sea form its W. and N. boundaries, and it is contiguous on the E., S.E., and S. with Groningen, Drente, and Overijssel; it includes the islands of Ameland and Schiermonnikoog. The flat and in parts marshy country is mainly agricultural, fertile and well watered, but unsatisfactorily managed. Considerable tracts are below sea level. Dairy farming, stock rearing, horse breeding, and peat cutting are important. At Sneek there is busy trade in cheese and butter, and at

Franecker there was a university until 1811. There are several large, marshy lakes, with good fishing, notably the Fleussens, Tjeuke, Sneeker, Sloter, and Bergumer lakes. There are good communications by rly., steam tramways, and canals. The chief town is Leeuwarden (*q.v.*); other centres are Bolsward, Sneek, Dokkum, Harlingen, Franecker, Stavoren, and Hinderloopen. Area, 1,250 sq. m. Pop. 467,750.

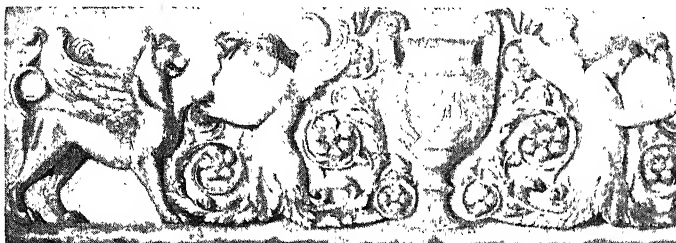
The German invasion of the Netherlands began on May 10, 1940, and by the late afternoon invading columns had swept across Friesland to the Afsluitdijk the 25-m. causeway enclosing the former Zuider Zee, but local forces maintained a bridgehead at Kornwerderzand until May 14. During the liberation of the Netherlands units of the Canadian 1st army entered Friesland on April 15, 1945, and by May 17 had cleared the province of the Germans who put up very little opposition.

East Friesland is a district in Hanover, Germany, once a separate principality. Lying between Groningen in the Netherlands and Oldenburg, it is also flat and marshy, and has agricultural and fishery interests. Its chief town is Aurich, others being Emden, Norden, and Leer. A canal runs from Emden to Wilhelmshafen. Troops of the Canadian 1st army took Leer from the Germans on April 29, 1945, and occupied Emden May 4, when the enemy forces in N.W. Germany surrendered. Area, 1,211 sq. m. Pop. (c.t.), 453,208. See Frisians.

**Frieze.** In architecture, the middle member of the entablature, between the cornice and architrave. The Greek frieze in its simple form was divided into panels or metopes by triglyphs or channelled blocks, the metopes being sometimes

Class of Society	Number of Societies	Number of Members	Total Funds £
1. Friendly Societies			
(a) without branches	2,576	6,022,897	127,436,441
(b) orders and branches ..	16,133	2,712,841	59,390,100
TOTAL .. ..	18,708	8,735,738	186,737,041
2. Collecting Societies ..	140	29,508,408	125,851,127
3. Cattle Insurance Societies .. ..	38	1,720	9,008
4. Benevolent Societies	110	138,253	1,718,066
5. Working Men's Clubs	2,242	947,394	4,682,563
6. Specially Authorised Societies .. ..	321	244,118	3,418,817
7. Shop Clubs .. ..	8	77,362	1,062,383
TOTAL .. ..	21,567	39,652,993	323,379,245





Frieze. Example of ancient frieze from Trajan's Forum, Rome

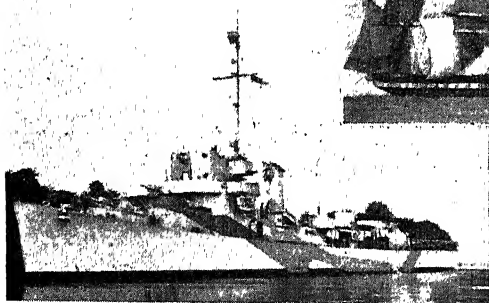
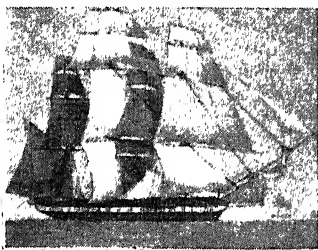
sculptured with a floral design, and sometimes, as in the Parthenon, with figures. In the earliest temples the metopes and triglyphs were composed of separate blocks of stone, artificially bonded; but the Ionic and later styles aimed at making the frieze a continuous band encircling the building, with the joints practically concealed.

Different varieties of frieze developed in Roman and Renaissance times, and when domestic architecture assumed importance the feature was applied both to exterior and interior decoration. The friezes in Inigo Jones's designs are sometimes divided up by attic windows. Tudor doors, windows, and walls often have classic entablatures with friezes. Exterior friezes are now mainly confined to public buildings, but modern rooms are frequently decorated with a wall-paper frieze, and occasionally with a frieze pattern in low relief. The word, *Fr. frise*, Ital. *fregio*, probably comes ultimately from Lat. *Phrygium* (*opus*), Phrygian (work). See Parthenon.

**Frigate** (Ital. *frigate*). Term of Mediterranean origin for a light warship. In Venice during

ship of the third rate. The first English ship to be classed as a frigate was the celebrated Constant Warwick, designed by Peter Pett for the earl of Warwick as a privateer, built at Ratcliff on the Thames in 1646, and purchased into the navy in 1649. Later the term was applied to fast vessels of the fifth rate mounting 25-50 guns. Suitable for either attack or defence of seaborne commerce and for scouting duties with the fleet, these ships were the counterpart of the modern cruiser.

Not until 1881 was the designation cruiser introduced into the Royal Navy. Earlier it had been employed only for a ship of any type engaged in cruising. The term frigate did not cease to be applied to ships of earlier date, such as the Inconstant and Raleigh, until in 1887 it was finally ousted by the more comprehensive term cruiser. During the Second Great War, an improved type of escort vessel in 1942 was classified as a



Frigate. H.M.S. Bentinek, a Captain class frigate of the Second Great War. Upper picture, frigate of war in the days of sailing ships

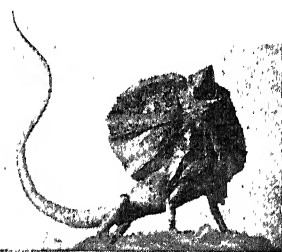
the 15th century the frigate was a swift flush-decked vessel, propelled by sail and oars, told off for duty in war under the superintendents of dockyards; but by the 17th century the Venetian frigate had become a seagoing war-

locks, and bays, and displacing 1,370-1,600 tons. Armaments varied from one to four 4-in. guns, as well as anti-submarine weapons.

**Frigate Bird** (*Fregata*). Genus of sea-fowl related to the gannet and the pelican. They have a long,

slender body, ending in a forked tail resembling that of the swallow, and the beak is long and hooked. Found only in the warmer seas, usually far from land, they live upon the fish they catch or rob from other sea-fowl.

**Friilled Lizard** (*Chlamydosaurus*). Australian lizard. Measuring nearly a yard in length, it is distinguished by a large membranous frill on either side of the neck. This is usually folded back, but can be erected when the animal is alarmed, apparently for the purpose of frightening its enemies. It is a harmless creature, found only in sandy districts.



Friilled Lizard. *Chlamydosaurus kingi* from Australia

**Frimaire** (Fr., the month of frost). Third month in the year as rearranged during the French Revolution. It began on Nov. 21 or 22. See Calendar.

**Friml**, CHARLES RUDOLF (b. 1881). Czech-born American composer. Born at Prague, Dec. 7, 1881, he was educated at the conservatoire there, and went to the U.S.A. in 1904. A brilliant pianist, he became a composer of light music distinguished by graceful melody. His most popular musical comedies were *Rose Marie*, 1924; *The Vagabond King*, 1925. The *Donkey Serenade* was a revival of a tune in his operetta *The Firefly*, 1912.

**Fringe**. Strictly, loose threads forming an ornamental border to anything. The word is also used for hair cut straight across the forehead. It is used by analogy for



Frigate Bird. Specimen of the larger species found in tropical regions

anything on the border, e.g. the fringe of empire.

**Fringe Tree** (*Chionanthus*). Genus of shrubs or small trees of the family Oleaceae. Natives of China and N. America, they have large, smooth, magnolia-like leaves, and white, sweet-scented flowers which hang in graceful clusters; the corolla is cut into narrow segments, which give it a fringed appearance. *C. virginica*, the American species, is also known as snowdrop-tree.

**Frinton and Walton.** Urban dist. of Essex, England. It includes Frinton-on-Sea, a seaside resort, and Walton-on-the-Naze (q.v.). Frinton has good bathing facilities, golf links, and championship tennis courts. A model garden town its avenues are wide and are planted with trees. Sea walls and promenades have been constructed, and the greensward and cliffs extend to 50 acres. Pop. (1951) 8,448.

**Fripp, Sir Alfred Downing** (1865-1930). A British surgeon



Sir Alfred Fripp,  
British surgeon  
Russell

Born at Blandford, Sept. 12, 1865, he was educated at Merchant Taylors' and London university. In the South African War he was chief civilian medical officer at the Imperial Yeomanry hospital. Surgeon to Guy's and other London hospitals, he was also surgeon to Edward VII and George V. In 1903 he was knighted, and he died Feb. 25, 1930.

**Frisches Haff** (Pol. Zalew Wislany). Lagoon off the Baltic coast of Europe. It is separated from the Gulf of Danzig by a strip of land 40 m. long and about one mile wide, the Frische Nehrung (Mierzeja Wislana). The lagoon is 50 m. long and of varying breadth; it covers 330 sq. m. The opening to the Baltic is at the N.E. end, where a channel has been dredged for traffic. Before 1510 the lagoon was entirely landlocked, but in that year a storm destroyed a little of the sand barrier. Several streams flow into it.

**Frisian Islands.** A chain of islands off northern Europe, extending from the coast of Denmark to the N.W. corner of the Netherlands. They are the remains of a former coast-border of Jutland and the Netherlands; and their sandy character and lack of vegetation attest the process of erosion they

must have undergone in the course of centuries; local legends tell of old villages now submerged. Most of the coast villages of today are popular sea-bathing resorts.



Fringe Tree. Foliage and drooping flower of the Chinese shrub

The chain may be divided into three groups, N. Frisian, East Frisian, and W., or Dutch, Frisian. The N. Frisian Islands lie off the W. coast of Denmark and Germany, from which they are separated by the Watten, an arm of the sea. Interspersed among them are the Halligen, low sandbanks covered with marine grass.

The principal member of the group is Sylt, with an area of 39 sq. m. and a pop. of 6,713. Its capital is Westerland (pop. 3,642), situated on its W. side and in two portions. Together with Heligoland, which the Germans included among the N. Frisian islands, Sylt was a base for the Luftwaffe in the Second Great War. Both islands were bombed by the R.A.F., and the 7-mile Hindenburg dam linking Sylt with the mainland was damaged. Troops of the British 11th armoured division occupied the islands on May 11, 1945.

Next in importance is the island of Föhr, on the E. coast of which lies the village of Wyk (pop. 2,782), which possesses an interesting museum of Frisian antiquities and handsome public gardens. Amrum, 6 m. long by 3 m. broad, lies S. of Sylt.

The East Frisian Islands form an almost continuous line masking the German coast between the mouths of the Ems and the Weser. Nordney (pop. 5,564) is 8 m. long by 1½ m. broad; its mild climate and magnificent stretch of sandy beach make it a favourite summer resort. Borkum (pop. about 3,000), situated at the mouth of the Ems, 9 m. N. of the Dutch coast, is 5 m. long by 2½ m. broad, and is perhaps the most popular holiday resort. Its breed of milch-cattle is much es-

teemed. Wangeroog, 5 m. long by 1 m. broad, is included in Oldenburg. About 2 m. W. of the present village are the ruins of an older inhabited site overwhelmed by a violent storm. Spiekeroog is 5 m. long by 1½ m. broad and attracts comparatively few summer visitors. Langeoog is 8½ m. long by 1 m. broad.

The Dutch Frisian group, of which the most important islands are Terschelling, Vlieland, and Texel, screens the Afsluitdijk enclosing the former Zuider Zee. The inhabitants are chiefly concerned with agriculture and dairy-farming. Frisian, the original speech of these islands, as well as the language of their laws, bears a remarkable resemblance to older forms of English.

**Frisians.** People of Teutonic stock inhabiting the area now comprising the Dutch provinces of Friesland and Groningen and the German district of East Friesland. They were closely connected with the other Low German peoples along the coast, notably the Angles and Saxons, and the old Frisian dialect survives in the Dutch and German Friesland and in parts of W. Schleswig, especially in the coastal country near Tondern.

The Frisians were partially conquered by the Roman general Drusus, c. 12 B.C., but their early history is obscure. Numbers of them were probably associated with the Angles and Saxons in their incursions into Britain during the 4th and 5th centuries. Friesland generally was made tributary to the Frankish empire of Pepin II in 689, and after a revolt was reconquered by Charles Martel in 736. It fell to Charlemagne in 784. It retained a fair degree of independence during the Middle Ages. For a short time in Saxon possession, Friesland was ceded to the emperor Charles V in 1523, but joined the United Provinces in 1579, remaining one of these until 1795, when it was merged into the Dutch territories.

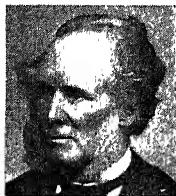
East Friesland became distinct from the rest of the Frisian lands in 1430, when it became a fief of the powerful Cirksens family, by whom it was ruled until 1744, when it was incorporated in Prussia. Transferred to Holland in 1808, and in French possession 1810-13, it was recovered by Prussia and ceded by her to Hanover in 1815.

**Frit.** Name commonly given to a small black fly, *Oscinella frit* (order Diptera, family Chloropidae). Its larva is highly destruc-

tive to oats and other cereals in Europe, including the U.K.

**Frith, JOHN** (1803-33). English martyr. The son of a Westerham innkeeper, he was educated at King's College, Cambridge, afterwards becoming a member of Christ Church, Oxford. He helped Tyndal to translate the Bible, and his abilities and scholarship soon made him prominent among the advocates of the reformed faith. This led to his enforced departure from England, and for about six years he lived in Germany and Holland. Having returned to England, he was arrested, but on examination he defended his beliefs. He was burned to death at Smithfield, July 4, 1833.

**Frith, WILLIAM POWELL** (1819-1909). British painter. Born at Aldfield, Yorks. Jan. 9, 1819, son of



*Wm. Frith*

an innkeeper, he studied at Sass's Academy, Bloomsbury, and at the R.A. schools. Founding his style on that of Daniel Maclise, he began to paint literary subjects, his *Malvolio* being hung at the R.A., 1840. He was elected A.R.A. in 1845, and R.A. in 1853. He scored popular successes with *Ramsgate Sands*, 1854; *Derby Day*, 1858; *The Railway Station*, 1862; *Private View at the R.A.*, 1881. He died in London, Nov. 2, 1909.

**Fritillaria.** In botany, name given to a large genus of Liliaceae. (See Snakeshead.) Fritillary is also the name given to several species of butterfly of the tribe Argynnidae. Several of these are native in Great Britain. See Butterfly, colour plate.

**Fritsch, WERNER VON** (1880-1939). German soldier. He was born Aug. 4, 1880. He served in the First Great War as a staff officer, and later was instrumental, in association with von Blomberg, in building up a secret staff for training the new illegal armed forces. In 1934 he became c.-in-c. of the German army, with the rank of colonel-general, but was known to have opposed Hitler on questions of military policy. In Feb., 1938, he was accused of unspecified charges and deprived of his post; a court of honour acquitted him, and he was appointed c.-in-c. of an artillery regiment. On Oct. 13, 1939, Fritsch was reported to have been killed in the fighting before Warsaw on Sept. 22. His death was later disclosed as assassination by an S.S. man, who was promoted to high rank.

**Friuli.** Historic name of a district of Italy which lies at the head of the Adriatic. Up to 1919, it was partly in Austria, partly in Italy. The Isonzo and Tagliamento flow through it, and there was much fighting here during the First Great War. An inhabitant of Friuli was called a *furlanio* (English Furlanian).

The district took its name from the Roman settlement of Forum Julii, later Cividale del Friuli (*q.v.*) The Lombards ruled it for some

centuries, after which it passed from one ruler to another. Venice secured part, while eastern Friuli was added about 1500 to the lands of the crown of Austria. In 1798 Austria obtained the Venetian part, which she retained up to 1805. In 1866 the new kingdom of Italy was given the part that had previously belonged to Venice. By the treaty of Rapallo, 1920, the whole was assigned to Italy, most of it becoming the province of Udine, the rest part of the province of Gorizia.

**Friuli-Venezia Giulia.** Region of Italy, formed in 1947 from the provs. of Udine and Gorizia. Area 2,950 sq. m. Pop. (1951) 928,792.

**Frobenius, LEO** (1873-1938). German explorer and ethnologist, born June 29, 1873, in Berlin. From 1898, as a specialist on African pre-historical finds, he worked in ethnological museums at Bremen, Basel, and Leipzig, and led expeditions into the Sudan, the Congo, the Nubian desert, and S. Africa. He founded the institute for the morphology of cultures at Frankfurt-on-Main, where he was professor of ethnology from 1925 until his death, Aug. 9, 1938. His claim, in 1911, to have found the legendary Atlantis in W. Africa, and numerous books, established him as an international authority on vanished civilizations.

**Frobisher, SIR MARTIN** (c.1535-94). English sailor. Born in Yorkshire, he made a voyage to Guinea in 1564, and spent some years in voyages to the Levant and N. Africa. In 1575 he was commissioned by the Muscovy Company to search for the North-West



William Powell Frith. *Ramsgate Sands*, an example of one of the artist's larger compositions, exhibited at the Royal Academy in 1854 and purchased by Queen Victoria

Passage, and set out on June 7, 1576, with two ships of 25 and 20 tons respectively, sighted Greenland, where he lost the smaller vessel, and reached Frobisher Bay in N. America.



Sir Martin Frobisher,  
English sailor  
From a print

Returning to England, Frobisher repeated the voyage in 1577 as admiral of the company of Cathay, and brought back 200 tons of pyritic ore, which he incorrectly believed contained gold. In 1578 he made a third voyage, and discovered a new strait, but did not make any survey. In 1586 he was vice-admiral to Drake's expedition to the W. Indies, and, in command of the *Triumph*, helped to defeat the Armada (1588). Knighted for his gallantry, he was vice-admiral to Sir John Hawkins in 1590, being sent by Raleigh to harry the Spanish coast in 1591. Mortally wounded in the sea attack against Brest, then held by the Spaniards, he died at Plymouth. Nov. 22, 1594. A Life by W. McFee appeared in 1928.

**Frobisher Bay.** Inlet off the coast of British N. America. Long and comparatively narrow, it cuts into the eastern end of Baffin Island from the Atlantic. Its length is about 250 m., and its breadth about 20. It is about 200 m. S. of the Arctic circle.

**Frock** (late Lat. *froccus*). Word used as both noun and verb. In the former sense it is applied to a monastic robe, with loose sleeves, reaching to the feet; to a dress worn by women and girls; to a rough worsted garment (strictly, Guernsey frock) worn by sailors over or in place of a shirt; and to a double-breasted, skirted coat formerly worn by men and properly called a frock coat. As a verb the word to frock means, figuratively, to make a man a monk or priest; to unfrock means to deprive monk or ecclesiastic of his privileges as such. See *Costume*; *Gown*; *Smock*.

**Fröding, GUSTAF** (1860–1911). Swedish poet. Born in Värmland, Aug. 22, 1860, and educated at Karlstad and Uppsala, he afterwards joined the staff of the Karlstad paper, and wrote occasional verse. Spending some time in Germany, he studied English and German lyrical poetry, from which he made translations. His first book, *Guitar and Concertina*, 1891,

was an immediate success. New Poems and other books were issued 1894–98, and in 1901–02; his collected works were published. Much of Fröding's verse was written in dialect.

His original humour and spontaneity, vivid portrayal of Swedish life, lyrical perfection, and pithy language, which has already influenced the Swedish tongue, have placed him first among modern Swedish poets. His last years were spent mostly in hospital, but in 1910 he published a volume of poems, *Second Harvest*. He died Feb. 8, 1911.

**Froebel, FRIEDRICH WILHELM AUGUST** (1782–1852). German educational reformer. Born at Oberweissbach, Thuringia, April 21, 1782, he spent his youth in the heart of the forest, where his long observation of nature gave



*Friedrich Froebel*

him many of the ideas which later marked his teachings. He studied at Jena, 1801, and at Göttingen, 1811, teaching in the interval at Pestalozzi's school. In 1813 he served in the War of Liberation in Lützow's corps. In 1816 he opened a school at Griesheim, Thuringia, transferred later to Keilhau.

His book, *The Education of Man*, appeared in 1826, and he did important work in training teachers at Burgdorf, Switzerland, during 1833–37. He opened his first kindergarten (children's garden) in Blankenburg, near Keilhau, in 1837, by which date his principles were making headway. Froebel spent his remaining years lecturing, writing, and teaching. He died June 21, 1852.

The detailed methods of teaching recommended by Froebel are no longer used, but his principles find expression in all schools where education is based on natural growth and development, on the value of creativeness and play, and on the child's need for actively following his genuine interests. His name is commemorated in the Froebel Foundation (*v.i.*). Consult F.F. and English Education, ed. E. Lawrence, 1952.

**Froebel Foundation.** National society formed by the amalgamation of the British Froebel society and the national Froebel union.

It is an examining and inspecting body and issues certificates and diplomas. It organizes lectures and holiday courses for teachers and students, maintains a library and an employment agency for teachers, and publishes the *Froebel Bulletin* and various pamphlets. Membership is open to all who are interested in the education of children up to 12 years of age.

The training of teachers is one of the main interests of the foundation. Besides qualifying for the certificate of the foundation, students at the Froebel Educational Institute, the Maria Grey Training College, and the Rachel McMillan Training College qualify for the certificate of the University of London Institute of Education; those at Westhill Training College, Birmingham, for the certificate of the Birmingham University Institute of Education; those at Offley Training College, Hitchin, for the certificate of the Cambridge Institute of Education. Students trained in colleges recognized by the Froebel foundation in the Irish Republic, Scotland, and Kenya are also examined for the Froebel teacher's certificate. Teachers who are already qualified and who have had at least a year's teaching experience are trained in part-time classes for the Froebel teacher's certificate.

The h.q. of the foundation is at 2, Manchester Square, London, W.1.

**Frog.** Smooth-skinned member of the order Salientia (tailless), of the class Amphibia. This order includes all the frogs and toads, numbering more than 1,000 species, which are distinguished from newts and salamanders by the absence of a tail in the adult stage. The name frog is restricted to the family Ranidae, of which nearly 200 species are known. The bony structure of all the frogs is peculiar in having the hinder half of the vertebral column modified into a simple jointless bone. The two bones usually found in the fore arm and lower leg of vertebrates are fused together. Frogs possess tongues whose base is in the front of the mouth; and have teeth in the upper jaw and palate only. The fore feet are not webbed; the hind feet are partially webbed.

Frogs are found in all parts of the world, except those having conditions that make their existence impossible. As frogs can live only in damp places, and spend part of their life cycle actually in water (as tadpoles), they are absent from the frozen poles and



Frog. Bottom, the edible variety, *Rana esculenta*. Top, common frog, *R. temporaria*

from deserts and the higher ranges of the mountains.

Like all Amphibia, frogs pass through a series of metamorphoses. The eggs are deposited in a jelly-like mass in fresh water, and hatch out as tadpoles, consisting of an oval body and a long tail. During this stage they breathe by means of gills. The tail and gills are gradually absorbed, and at the same time the four limbs make their appearance. At the completion of this stage they leave the water and take to a terrestrial life, breathing air by means of lungs. The air is taken in by a kind of swallowing action, and if the mouth is kept

open for any length of time the animal will die of suffocation, as it cannot inhale apart from the action of the mouth, owing to the absence of ribs. The food consists of insects and slugs, which are seized by thrusting out the long, sticky tongue. Frogs are therefore valuable to the gardener and should never be destroyed. The winter months are passed in a state of hibernation, in the mud of ponds or in holes and crevices.

Great Britain possesses two species of frogs, of which the common frog (*Rana temporaria*) is found almost everywhere. The edible frog (*R. esculenta*) is found mainly in the eastern counties, and is distinguished from the commoner species by its usually larger size and more mottled appearance, especially on the thighs. There is a distinct fold along each side of the body, and the males have a conspicuous round sac on either side of the head, which is distended when croaking. On the Continent and in N. America the edible frog is often used for the table, the flesh of the thighs resembling that of a very young chicken; but it is rarely eaten in Great Britain.

**Frog.** In engineering, two short lengths of rail spliced together and forming part of a railway crossing. A wrecking frog is a device with one end raised to form an inclined plane by which derailed rolling stock can be replaced on the track. The frog is laid alongside the rail with the lower end towards a wheel of the derailed vehicle; when the latter is pulled, the wheel mounts the frog, which guides it on to the rail. It is also known as a railway

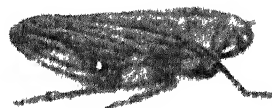


Frog used in engineering as part of a railway crossing

ramp. The term is also applied to part of a horse's hoof, and to that part of a soldier's equipment which carries the sword or bayonet.

**Frogbit** (*Hydrocharis morsus-ranae*). Floating aquatic herb, of the family Hydrocharitaceae. A native of Europe and N. Asia, it has long-stalked, kidney-shaped leaves, reddish beneath; and three-petalled white flowers. It sends out runners which produce new plants, and in autumn bulbs, which sink to the bottom of the ponds and ditches and pass the winter in the mud. In spring they rise to the surface, and put out leaves. The male flowers are in clusters of two or three; the females solitary

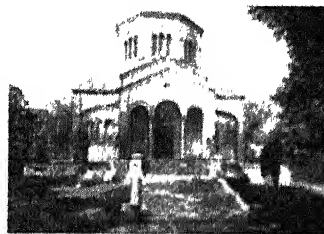
**Frog Hopper.** Name popularly given to a large family (*Cercopidae*) of hemipterous insects. Their



Frog Hopper of the Aler, *Anura-phora alni*. Above, spiny-legged frog hopper, *Eucanotus interruptus*

mostly grey or brown, and leap vigorously if disturbed.

**Frogmore.** Royal residence of Berkshire, England. It is within the Home Park, Windsor, 1 m. S.E. of the castle; and was purchased by Queen Charlotte in 1800. The duchess and King died here in 1841.

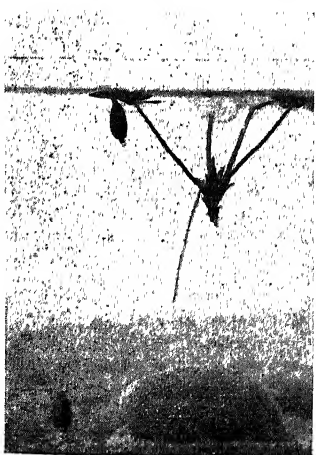


Frogmore, Windsor. Royal Mausoleum built by Queen Victoria, 1862-70

Since then it has been used by other members of the royal family. A cruciform structure surmounted by an octagonal lantern was erected by Queen Victoria over the tomb of the prince consort. The queen's remains were buried here in 1901.

**Frogmouth** (*Podiceps*). Genus of night-flying, insectivorous birds of the family Caprimulgidae, which includes the nightjar. They are notable for their very wide mouths. There are numerous species, distributed over Australia, Malaya, and the eastern districts of India.

**Frogs, THE.** Comedy by Aristophanes, produced 405 B.C. The god Dionysos goes down to Hades to fetch up Euripides from the dead. A contest for supremacy takes place between the rival tragedians Aeschylus and Euripides, in which each humorously criticises the specimens of style given by his opponent. The palm is awarded to Aeschylus, who returns to earth with Dionysos to offer the benefit



Frogbit. Bulbs rising to the surface. One has developed into a plant with four leaves

of his advice to the Athenians. The play takes its name from the chorus of frogs who accompany the god in his passage over the lake of the underworld.

**Frohman, Charles** (1860-1915). American theatrical manager. Born at Sandusky, Ohio, June 12, 1860,



Charles Frohman,  
American theatrical  
manager

he was employed in The Daily Graphic offices, New York, and then as box-office clerk at Hooley's Theatre. In 1893 he established himself at the Empire Theatre, New York, and later controlled five other theatres. In 1897 he became lessee of the Duke of York's, London, where he brought out Barrie's plays, *The Admirable Crichton*, 1903; *Peter Pan*, 1904; *What Every Woman Knows*, 1908; and experimented with a repertory system in 1910, producing plays by Barrie, Shaw, Galsworthy, and Granville-Barker. He was drowned when the *Lusitania* was sunk, May 7, 1915.

**Froissart, Jean** (c.1338 c.1404). French chronicler. The son of an heraldic painter, Froissart was born at Valenciennes, and probably started to write the first part of his history about 1358. He became secretary to Philippa of Hainault, queen of Edward III of England, in 1361,



Jean Froissart,  
French chronicler

and while in her service visited the court of David II of Scotland. In 1366 he followed Edward the Black Prince to Gascony, and paid visits to several courts of N. Italy. Philippa died in 1369, and he found other patrons in Count Robert of Namur, Duke Wenceslas of Brabant, and Guy de Blois, overlord of Chimay, from whom he obtained the benefice of Lestines-au-Mont. In 1388 Froissart visited Béarn, and travelled with the knight Espaing de Lyon, whose stories gave him much picturesque matter for his *Chronicles*, to the brilliant court of Gaston Phoebus of Foix at Orthez. In 1395 he paid another visit to England. He died at Chimay.

The *Chronicles*, in four books, trace the history of the main events

in England, Scotland, Ireland, France, Flanders, and Spain, as well as happenings at the papal courts at Rome and Avignon, between 1325 and 1400, and form one of the greatest of medieval historical works. The first book, much of its material borrowed from the earlier chronicler Jean le Bel, views the course of events largely from the English point of view, written as it was under English patronage. But on the whole Froissart gives a fair version of events as he saw them, or as the witnesses available at the time described them to him. He spared no effort in the search for reliable testimony.

Modern research has corrected errors of chronology, statistics, and topography, but Froissart shows a great advance on most of his predecessors. He definitely presents his picture as a whole, relating cause and event in due sequence, not content merely to enumerate bald facts. But his work is chiefly prized for its vivacious narrative of the best side of the chivalric age. Froissart was the friend of several notable poets, especially Eustache Deschamps, and probably Chaucer. The first dated edition of the *Chronicles* appeared in 1504; the first Eng. trans. by Lord Berners, 1525.

**Frombork.** See Frauenburg.

**Frome** or **FROME SELWOOD.** Urban dist. and market town of Somerset, England, on the Frome, 24 m. S.E. of Bristol. Brewing, printing, and cloth making are the chief occupations; the woollen industry has greatly declined. The parish church, a Decorated building of the 14th century, was restored on a magnificent scale in the 19th cent. There are also a museum and a grammar school. Market, Wed. (cattle) and Sat. (general). Pop. (1951) 11,298. Pron. from.

**Frome.** Lake of S. Australia. It lies in the Eastern Plains, 50 m. E. of the Flinders Range. About 50 m. long from N. to S., it is 25 m. wide from E. to W. The Wilpena river issues from its S. extremity.

**Fromentin, Eugène** (1820-76). French painter and writer. Born near La Rochelle, he studied under Cabat and painted Algerian life and landscape, his style showing the influence of Delacroix. He is

better known, however, as the writer of *A Summer in the Sahara*, *A Year in the Sahel*, both models of the art of word-painting, and of *The Masters of Past Time* in the Low Countries, a book of descriptive art-criticism. He died Aug. 27, 1876.

**Fronde, THE.** Name given to the insurrection and civil war in France under the regency of Anne of Austria and Cardinal Mazarin, 1648-53. Its two phases are known respectively as the parliamentary Fronde and the Fronde of the princes. The name comes from that of a small sling used during the disorders in Paris.

In 1648 Mazarin sought the sanction of the parliament of Paris to fresh and burdensome taxes by offering that body certain fiscal exemptions. This the parliament refused, and drew up forthwith a series of 27 articles of constitutional reform, forbidding the imposition of unauthorised taxes, reducing certain imposts, etc. After momentarily yielding, the queen-regent suddenly arrested the parliamentary leaders, Broussel, Blancomessnil, and Charton. The Parisians raised street barricades and the court party was alarmed into releasing the prisoners and granting the required reforms. Mazarin, however, strengthened by the adherence of Condé, obliged the parliament to sign the peace of Ruell, March 11, 1649, with which the first phase closed.



Frome, Somerset. The High Street, market place, and cross

The next phase was essentially a struggle between Condé and Mazarin. Jealous of Mazarin's power, Condé turned against him, but was arrested and imprisoned with other malecontent nobles, Conti and Longueville. Another foe of the cardinal, Paul de Gondy, a powerful ecclesiastic, stirred up revolt in Paris, forcing the minister to release Condé and to quit France early in 1651. He returned in Jan.



1652, whereupon Condé, with Spanish aid, headed a powerful movement against the court party. Raising an army in the south, he defeated the royal forces at Bléneau, and, despite Turenne's able defence at the Faubourg St. Antoine, occupied Paris. His unpopularity forced him to leave in July, when the court and the cardinal returned. By the summer of 1653 the Fronde, in spite of a determined struggle in Guienne, was crushed, and this singularly unnecessary civil war had ended in the powers of the parliament of Paris being severely curtailed and the monarchical power correspondingly consolidated. See France: History; Mazarin.

**Front.** Military term. In infantry drill it indicates the direction in which troops face when drawn up in one or more ranks, irrespective of whether the original front rank is in front or in the rear. In warfare it describes an area in which the opposing armies are in fighting contact, and also the rear areas occupied by immediate administrative and supply services of the combat troops and reserves. During the First Great War the term "the front" was generally used to denote the area of operations in France and Flanders (the Western front).

**Frontenac, LOUIS DE BUADE, COMTE DE (1620-98).** French governor of Canada. He belonged to a noble family of Béarn, and served in the French army with distinction. In 1672 he was sent out to New France as governor, and held that position until 1682, and again during 1689-98. As a ruler he was successful, but his autocratic temper caused constant quarrels with other high officials, especially Laval-Montmorency, bishop of Quebec. Frontenac died at Quebec, Nov. 28, 1698.



Louis de Frontenac  
Statue by P. Hébert  
in the Parliament  
Buildings, Quebec

98. As a ruler he was successful, but his autocratic temper caused constant quarrels with other high officials, especially Laval-Montmorency, bishop of Quebec. Frontenac died at Quebec, Nov. 28, 1698.

**Frontier.** That part of a country which fronts or faces another country. The term is generally used in a military sense to describe a country's fortified border, and is often denoted by the name of the adjacent country or countries, e.g. the Franco-Spanish frontier. Because their delimitation is governed by military reasons, European frontiers follow geographical rather than ethnological lines. The

frontier is also used in undeveloped regions to indicate the farthest point of civilized settlement, e.g. the old-time Indian frontier of the U.S.A., which moved steadily W. until by 1890 it may be said to have disappeared. In India, the North-West frontier gave its name to a province (now part of Pakistan), as the administrative control of the area was essentially strategically in relation to Afghanistan. The only unfortified frontier in the world is the border between Canada and the U.S.A.

**Frontiersmen, LEGION OF.** British organization of men who have lived in the colonies, dominions, or on the frontiers of the Empire for a continuous period of not less than three years, or have served abroad in the armed forces or the merchant navy, and are prepared to place their services at the disposal of the country in time of emergency. The legion was formed in 1904 by Capt. Pocock and Col. Driscoll, and was originally recruited from men who had served in the S. African War, principally Driscoll's Scouts. F.M. Lord Birdwood became president of the legion, which has its headquarters at 21, Bedford Street, London, W.C.2.

**Frontinus, SEXTUS JULIUS (c. A.D. 40-105).** A Roman soldier. While governor of Britain during 75-78 he gained a great victory over the Silures of S. Wales. He was the author of *Strategemata*, a collection of anecdotes of famous military leaders, and of *The Aqueducts of Rome*, an account of their construction and maintenance, written after his appointment as *curator aquarum* or superintendent of the water-supply in 97.

**Fronto, MARCUS CORNELIUS (d. c. 170).** Roman rhetorician. Born at Cirta in Africa, he flourished in the reigns of Hadrian and Marcus Aurelius, with the latter of whom he was on friendly terms. As an advocate and teacher of rhetoric he amassed a large fortune, and was raised to the consulship in 143.

A number of Fronto's letters, including correspondence with Marcus Aurelius, discovered by Cardinal Mai at the beginning of the 19th century, do not justify his great reputation among his fellow-countrymen, although they exhibit him as a man of honourable and upright character. He was the father of what was called the *elocutio novella*, "partly a return upon the style of the older (pre-Ciceronian) Latin authors, partly a new growth based, as theirs had

been, on the actual language of common life" (Mackail). This was destined to be the parent of the Romance languages.

**Front Populaire (Fr.).** See under Popular Front.

**Front Range.** Name given to a section of the Rocky Mts. It is the most eastern part of the range, hence its name. In the state of Colorado, its chief peaks are Pike's Peak and Long's Peak; both are over 14,000 ft. high.

**Frosinone.** Town of Italy, capital of a prov. of the same name. Built on a hill overlooking the Cosa, an affluent of the Sarno, 54 m. by rly. S.E. of Rome, the town has many churches, holds an annual fair, and is noted for its wine. In former times its outskirted parts were infested by brigands. Pop. (1951) town, 24,284; prov., 455,472.

Near the town are remains of the ancient Volscian city of Frosinone, which was conquered by the Romans in 304 B.C.

**Frost.** A condition of the weather. When the temperature of the air is at, or below, the freezing point of water (32° F.) a screen frost is said to have occurred. A ground frost is defined as an occasion on which the temperature registered by a thermometer laid on the grass reaches a value of 30° F. or less. This limit is adopted because it has been found that injury to the tissues of growing plants is not brought about until the temperature has fallen appreciably below the freezing point. Favourable nights for ground frosts have little wind and clear skies. Under such conditions the surface of the grass or soil is cooled rapidly through radiation of heat into the atmosphere. If the temperature of the radiating surface falls to the freezing point, and at the same time the air is saturated with water vapour, ice is deposited in the form of crystalline needles or feathers. This white hoar frost may consist partly of frozen dew. When low temperatures and wet fog occur together, the fog droplets freeze on exposed cold objects, producing a mass of rough crystals known as rime. Glazed frost occurs when rain falls into layers of cold surface air; this is the clear ice which makes roads impassable and brings down overhead wires.

To protect fruit crops from damage by frost, orchard heaters have been widely used. In choosing positions for orchards, natural frost hollows (where cold air collects in pools) must be avoided,

and if slopes are to be cultivated lanes must be provided in order that downward-flowing cold air can be drained away efficiently. Crops may also be damaged in late spring by cold strong winds which produce the so-called wind frosts. Here damage is greater at the higher levels.

Much more serious than the local short-lived radiation frosts are the severe persistent frosty spells due to the influx of dry, cold, Arctic air during anticyclonic weather. Among noteworthy frosts experienced in the British Isles were those of 1683-84; 1740, 1795; Jan.-Feb., 1814, when the last of the famous frost fairs was held on the Thames; 1890-91; Feb., 1895, which was preceded by heavy snowfalls; Jan., 1940, with its great ice (glazed frost) storm; Feb., 1947, in some places the coldest month of the century up to that time. See Dew; Glazed Frost; Hoar Frost; Ice.

**Frost, JOHN** (d. 1877). English Chartist. He was appointed mayor of Newport in 1836, represented Monmouthshire at the Chartist convention of 1839, and was removed from the commission of the peace for seditious speeches. Hailed as a popular champion, on Nov. 4, 1839, he led an armed mob into Newport. Frost was sentenced to be hanged, drawn, and quartered, but the sentence was commuted to transportation for life. In 1856 he received a free pardon. He died at Stapleton, near Bristol, July 29, 1877.

**Frost, ROBERT LEE** (b. 1874). An American poet. Born at San Francisco, March 26, 1874, and educated at Dartmouth College and Harvard university, he became a farmer. Professor of English at Amherst College, 1916-20, 1923-25, and 1926-38, he was



Robert L. Frost,  
American poet

awarded the Pulitzer prize for poetry, 1924, 1931, 1937, and 1943. His first volume of verse, *A Boy's Will*, appeared in 1913; *The Love-ly Shall be Choosers*, 1929; *The Lone Striker*, 1933; *A Witness Tree*, 1943; *Complete Poems*, 1951. Much of Frost's poetry is descriptive of the beauty of the New England countryside, and for simplicity of subject and diction has been likened to that of Edward Thomas, whose acquaintance he made in 1914.

**Frost-bite.** Localised gangrene of the tissues produced by exposure to severe cold. The parts of the body most likely to be involved are the fingers and toes, owing to the more sluggish circulation of the blood in the extremities, and exposed parts such as the nose and ears. The first sign of frost-bite is a patch of redness with slight swelling and sometimes severe pain. If the exposure continues the part becomes white, hard, shrunken, and waxy-looking, but without pain, so that the individual may be unaware of what is taking place. Ultimately the part becomes black and ulcerated.

The old idea that frost-bites should be treated by rubbing with snow and water is now quite exploded, according to A. H. Macklin, surgeon to the Imperial trans-Arctic expedition, and the best treatment consists in gentle massage of the frozen part with a warm hand, after which it should be wrapped in dry cotton wool. Greasy applications should be avoided. Common practice in the Arctic is to place a frozen hand next the skin between the thighs, and to impede the painful renewed flow of blood by warmth combined with gentle compression. If actual gangrene occurs the part must be kept carefully protected and aseptic until a line of separation forms, and the subsequent ulceration heals.

**Froude, JAMES ANTHONY** (1818-94). British historian. Son of the Rev. Robert Hurrell Froude, he was born at Dartington, Devon, April 23, 1818. Educated at Westminster School, in 1835 he entered Oriel College, Oxford, afterwards becoming a fellow of Exeter. At Oxford Froude was associated with the Tractarians, but he never joined them, although he took Holy Orders in 1844. Influenced by Carlyle's books, he broke with orthodox religion, expressed his changed views in *The Nemesis of Faith*, 1848, gave up his fellowship, and, as soon as the law permitted, became a layman once more.

In 1849 he made the acquaintance of Kingsley and, more important, of Carlyle, and set to work upon his *History of England* from the Fall of Wolsey to the Spanish Armada, 1856-70. It was completed in twelve volumes and is the monument to Froude's life. No historical work was ever more deservedly or more sharply criticised; yet its merits are as conspicuous as its faults. The style is powerful, graceful, and

restrained, for Froude, like Burke is "one of the great masters of the high and difficult art of elaborate composition."

But against this are blemishes of partiality and worse, for critics have asserted that, in pursuance of his aim, the author did not hesitate to misquote his authorities. As pendants to this work Froude wrote *The Divorce of Catherine of Aragon*, 1891; *The Spanish Story of the Armada*, 1892; and *Lectures on the Council of Trent*, 1896.

In other directions Froude's writings led to acrimonious criticism. The English in Ireland in the 18th Century, 1871-74, was resented by the Irish and their friends. As the sequel to an intimate friendship, Froude was named as Carlyle's executor, and he published some *Reminiscences*, 1881; *Mrs. Carlyle's Letters*, 1882; and *Life*, 1882-84, which gave a markedly unfavourable picture of the relations between Carlyle and his wife. Froude was accused of misrepresentation, and he replied with two books: *Carlyle's Life in London*; and *My Relations with Carlyle*. Another controversy arose out of Froude's book, *Oceana, or England and her Colonies*, 1886.

Froude took an interest in politics, and was twice sent on missions to S. Africa by Lord Beaconsfield's government. In 1892 he succeeded Freeman as professor of modern history at Oxford. He died at Salcombe, Oct. 20, 1894. Froude's most delightful work is in the four volumes of *Short Studies on Great Subjects*, 1867-82. He also wrote *The Life and Letters of Erasmus*, 1894; an historical romance, *The Two Chiefs of Dunboy*, 1889; and for many years edited *Fraser's Magazine*. Consult Froude and Carlyle, W. H. Dunn, 1936.

**Froude, RICHARD HURRELL** (1803-36). Anglican divine. Elder brother of J. A. Froude, he was born at Dartington, March 25, 1803, and educated at Eton and Oriel College, Oxford, being a pupil of John Keble. As fellow and tutor of Oriel, he brought Newman and Keble together, and thus began the Oxford Movement (*q.v.*). Ordained deacon in 1828 and priest in 1829, he resigned his tutorship in 1830. While at Rome with Newman he began the *Lyra Apostolica*,



James A. Froude,  
British historian

his contributions to which are initialled  $\beta$ . After visiting the West Indies for his health, and lecturing there, he died of consumption at Dartington, Feb. 28, 1836. His Remains were ed. by Keble and Newman, part I, 1838, and J. B. Mozley, part II, 1839.

**Fructidor** (Fr., month of fruit). The twelfth and last month in the year as rearranged during the French Revolution. It began on Aug. 18 or 19. The 18th of Fructidor is the name given to the

*coup d'état* of Sept. 4, 1797, when the Directory used military force to check the growing power of the royalists. See Calendar.

**Fructose**, **LEVULOSE**, or **FRUIT SUGAR**. Variety of sugar which occurs together with dextrose in all sweet fruits. It is produced from cane sugar by hydrolysis with dilute sulphuric acid. Fructose is sweeter than cane sugar, and is not readily crystallised. It is frequently used as a sweetening agent for diabetic patients.

the *capsule* (with examples found in most families), which opens by valves, pores, or splits. Indehiscent fruits of the dry variety include the small, woody *achene*, e.g. buttercup; the *samara* of sycamore and maple; and the *caryopsis* (with fused pericarp and testa) of the grass family. Fleishy indehiscent fruits include the *drupe* with woody stone as in plum, almond, cherry; the *actinia*, or collection of drupelets found in blackberry, etc.; and the *berry* of tomato, gooseberry, orange, banana, etc. Helen L. Pursey

## FRUIT AND ITS VALUE AS FOOD

H. V. Taylor, D.Sc., and Other Writers

*Here is an explanation of what fruits are botanically, and how they are adapted to carry out their work, the dissemination of the seed of plants. This is followed by an account of the nutritional value, growing, and preserving of fruits useful as human food*

Fruit (Lat. *fructus*, enjoying) is a general term for that part of a plant which contains the seed. Many fruits are edible, and with this use the word is chiefly associated—the chief fruits being apples, pears, plums, grapes, currants, peaches, etc. Nuts are also fruit. The term is also used for any produce of the earth. A fruiterer is a dealer in fruit; and a fruitarian is one who lives mainly on fruit.

Botanically, the fruit is the structure developed by the plant after fertilisation of the ovules. The process of fertilisation induces the thin, green ovary wall to develop into the pericarp or fruit wall, which may be wholly or partly fleshy, leathery, or woody.

### Methods of Seed Dispersal

The function of the fruit is the nourishment, protection, and ultimate distribution of the enclosed seeds. Seed dispersal is active when the seeds are explosively shot from the plant; passive when they are carried away by agents. Wind dispersal is the most common method, as in the grass family, most of the Compositae, and many others. All such fruits present a large surface area to catch the slightest breeze, and this is brought about by wing-like expansions of the pericarp, as in sycamore "keys", or by bracts partially enclosing the fruit, e.g. in hornbeam, or by a pappus of hairs forming a parachute, e.g. in dandelion, willowherb. Dispersal by water is less frequent, an example being the coconut.

Animals and birds disperse fruits and seeds, either by eating the fleshy parts of soft fruits, e.g. apples, plums, and passing out the seeds in their droppings, or by carrying entangled in their fur or feathers barbed fruits which

are subsequently torn out or rubbed off at a distance from the parent plant. Nuts are carried away and stored by squirrels and monkeys; many of course are eaten but others are overlooked and germinate. The seeds of the grass family are often removed by beetles and ants, and larger grains such as wheat and maize by mice and birds.

**CLASSIFICATION AND STRUCTURE.** Fruits may be separated into two main groups according to whether the mature organ is formed solely by the development of the ovary wall, i.e. true fruits; or whether any other part of the plant (commonly the receptacle bearing the flower) swells and becomes part of the mature structure, i.e. false fruits.

False fruits, almost without exception fleshy, include the *pome* of apples and pears, the strawberry (in which the receptacle bearing the achenes becomes juicy and swollen), the *hypanthodium* of the fig, and the *sorosis* of mulberry and pineapple. The last two consist of a collection of fruits whose receptacles and common axis all become fleshy. In the fig, however, the receptacle forms a fleshy, hollow organ.

### Two Types of True Fruit

True fruits may be either dehiscent or indehiscent, i.e. the fruit may expose the seeds by openings in the pericarp, or the seeds may be exposed and disseminated only after the pericarp has decayed. Such fruits may be either dry or fleshy. Dehiscent fruits include the *follicle* (a pod which splits along the seed-bearing margins) as in columbine; the *legume*, which splits along both margins and is the typical fruit of the Leguminosae; the *siliqua* of the Cruciferae (a flattened pod with a false septum within); and

**NUTRITIONAL VALUE.** Fruits belong to the health protective foods. When fresh, they contain from 75 to 96 p.c. moisture, and so contribute no substantial nourishment to the diet. They provide little body-building protein and no fat. Their calories or fuel value are derived chiefly from carbohydrate in the form of easily assimilated fruit sugars. Their important nutritional value lies in health protective vitamins and food minerals, body regulating cellulose roughage (or bulk), and naturally distilled water.

### Vitamin Content

Their special contribution is vitamin C, which helps to keep the teeth and gums healthy and the body agile. Many fruits, particularly dried varieties, provide vitamin A, which fortifies resistance to infection and poor sight at night. Others provide the nerve-steadying vitamin B<sub>1</sub>, and growth-promoting B<sub>2</sub>. Calcium, phosphorus and iron occur in all fruits, contributing to good blood and sound body structures and functions. The bulk and water content assist in the elimination of toxic and waste matter. Ripe fruits are easily digested, but skins and seeds are not and should be discarded.

Fruits may be roughly divided into four nutritional classes: (1) Pulp fruit (apples, pears, bananas, etc.), moderately energising and laxative. (2) Berry fruits (currants, raspberries, etc.), mineral rich, kidney and nerve-tonics. (3) Citrus fruits (oranges, lemons, etc.), alkalinising, digestive-tonics. (4) Dried fruits (dates, prunes, etc.), very energising natural sweets and regulatory. (See accompanying table; also Food and Nutrition)

S. B. Whitehead, D.Sc.

**FRUIT GROWING.** In all climates and most parts of the world fruit is grown for local consumption. In areas where the environment is peculiarly suitable large acreages have been planted and important industries have developed. Re-

cently many dry areas have been made suitable by systems of irrigation, and this is now a common method in the fruit-growing areas in the western provinces of Canada, the U.S.A., Chile, Argentina, and Australia.

The principal fruits are apples, pears, oranges, grapefruit, lemons, bananas, grapes, raisins, and currants. The producing areas are:

Apples (thousand acres): U.S.A., 2,000; Germany, 1,000; U.S.S.R., 1,000; France, 900; U.K., 200; Canada, 200; Australia, 100.

Pears: U.S.A., U.S.S.R., Germany, France, Japan, Argentina, Australia, U.K., S. Africa.

Dried fruits, raisins, and currants are important products of the U.S.A., Greece, Australia, and, to a lesser extent, Turkey.

#### Fruit Growing in England

In England fruit growing has become a large industry, occupying 60,000 holdings and an area of 272,900 acres. Of this area 242,700 acres are given entirely to fruit trees of apples, pears, or plums; 11,260 acres are planted similarly but undercropped with currants, gooseberries, or raspberries; while 17,304 acres are planted with soft fruits not as an undercrop. Undercropping of trees with bush fruits, formerly

The most important fruit area is in Kent, at Sittingbourne, Faversham, Maidstone, and in the Weald. The second is centred round Wisbech, extending over the Isle of Ely into Norfolk, Cambridgeshire, Hunts, and the Holland division of Lincolnshire. The area known as the West Midlands is centred in Worcestershire, but extends to parts of Herefordshire, Gloucestershire, and Warwickshire. A few acres are given to apples for cider on most farms in Devon, Somerset, Gloucestershire, Herefordshire, and Monmouthshire. Special areas with strawberries for the early markets are

#### THE FOOD VALUES OF FRUIT

Kind of Fruit per 100 grams (about 3½ oz.)	Nutritive values				Protective values							
	Protein  gm.	Carbo- hydrate  gm.	Fat  gm.	Calories	Minerals			Vitamins				
					Ca mgm.	P mgm.	Fe mgm.	A In	B <sub>1</sub> International Units	B <sub>2</sub> mgm.	C in mgm.	
Apples	0.3	11.7	—	53	3.6	0.8	0.20	100	25	20	20	
Apricots, fresh	0.6	6.7	—	31	17.2	21.3	0.37	7,500	10	—	16	
Apricots, dried	4.8	43.4	—	198	92.4	118.0	4.00	9,800	—	70	20	
Bananas	1.1	19.2	—	83	6.8	28.1	0.41	385	15	35	15	
Blackberries	1.3	6.4	—	32	63.3	23.8	0.85	200	—	—	6	
Cherries	0.6	11.9	—	50	15.9	16.8	0.38	450	—	—	17	
Cranberries	0.4	3.5	—	16	14.7	11.2	1.11	28	—	—	25	
Currants, black	0.9	6.6	—	31	60.3	43.2	1.27	300	—	—	136	
Currants, red	1.1	4.4	—	23	35.8	29.5	1.22	—	—	—	50	
Currants, dried	1.7	63.1	—	266	95.2	40.4	1.82	—	—	—	16	
Dates	2.0	63.0	—	270	67.0	63.8	1.61	150	10	—	—	
Figs, green	1.3	9.5	—	44	34.2	32.2	0.41	80	18	—	2	
Figs, dried	3.6	52.0	—	245	284.0	91.5	4.17	100	50	—	—	
Gooseberries	0.6	9.2	—	40	18.5	19.0	0.58	—	—	—	30	
Grapes, black	0.6	15.5	—	66	4.2	16.1	0.34	70	10	—	40	
Grapefruit	0.6	5.3	—	24	17.1	15.6	0.26	—	10	—	50	
Lemons	0.8	3.2	—	16	107.2	20.7	0.35	—	—	15	65	
Loganberries	1.1	3.4	—	19	35.1	24.3	1.37	—	—	—	48	
Oranges	0.8	8.5	—	38	41.3	23.7	0.33	300	10	15	65	
Peaches, fresh	0.6	9.1	—	40	4.8	18.5	0.33	1,000	—	—	8	
Peaches, dried	0.55	53.0	—	220	35.6	116.0	6.75	4,500	10	—	50	
Pears	0.3	10.8	—	45	8.0	9.9	0.19	15	15	—	3	
Pineapple, fresh	0.3	11.6	—	40	12.2	7.8	0.42	150	25	—	10	
Plums, dessert	0.6	9.6	—	41	11.0	16.3	0.36	—	40	—	10	
Prunes, dried	2.4	40.3	—	175	37.7	83.0	2.9	3,500	90	—	1	
Raisins	1.1	64.4	—	269	60.6	32.8	1.55	95	—	—	—	
Raspberries	0.9	5.6	—	26	40.7	28.7	1.21	—	—	—	30	
Strawberries	0.6	6.2	—	28	22.0	23.0	0.71	—	—	—	46	
Sultanas	1.7	64.7	—	272	52.2	94.5	1.82	—	—	—	—	

Citrus fruits, including oranges, lemons, and grapefruit (thousands of trees): U.S.A., 40,300; Japan, 33,000; Spain, 28,000; Brazil, 25,000; Italy, 19,000; Palestine, 7,000; S. Africa, 4,200; Australia, 4,000; W. Indies, 1,500.

Bananas are grown, for commercial sale, in Jamaica, Mexico, Honduras, Brazil, Guatemala, Cuba, and the Canary Isles. The fruit is normally an important source of income for the W. Indies and the Canary Isles.

Grapes for table use are produced in Bulgaria, the U.S.A., Italy, Hungary, Netherlands, S. Africa, Belgium, Algeria, and Argentina. The areas of grapes for wine are France, Italy, Spain, Algeria, Portugal, and, more recently, S. Africa and Australia.

popular in England is now thought to be unwise, and modern orchards are planted either to trees or to soft fruits.

English-produced fruits in order of importance are: Apples, 3,800,000 trees; pears, 171,000 trees; plums, 4,725,300 trees; cherries, 660,000 trees; strawberries, 9,084 acres; black currants, 9,091 acres; gooseberries, 6,488 acres; raspberries, 2,232 acres. Loganberries, hybrid berries, cultivated blackberries, red currants, and white currants are also grown.

Those engaged in fruit growing for profit have to choose the areas carefully to avoid unsuitable soils and unfriendly climates. Well drained soils of medium or light texture with annual rainfall between 22 and 28 ins. are preferred.

in the Tamar valley, Cornwall-Devon border; Cheddar, Somerset; and Botley, Hants.

The principal varieties of apples are Early Victoria, Grenadier, Lord Derby, and Bramley Seedling, all culinary sorts, and Cox's Orange Pippin, Worcester Pearmain, Ellison's Orange, and Laxton's Superb for dessert. The most widely planted is the Bramley, but the Cox's Orange and other dessert varieties are preferred. Of plums the chief varieties are the Pershore, Purple Pershore, the Czar, Victoria, and Giant Prune. More recent plantings are of dessert varieties such as Victoria and the Gages. Of pears, Laxton's Superb, Fertility, and Conference are the most important. Strawberries for the main crops

are Huxley and for the early districts the Royal Sovereign. The Norfolk Giant is the chief commercial raspberry, and the Baldwin, Westwick, French, and Wellington are the favourite black currants.

The spraying of fruit trees and bushes has developed immensely, and it is now the practice for growers to carry out a spraying programme. This involves the application of a tar oil winter wash, followed by two or more summer sprays containing lime sulphur and, occasionally, insecticides. The smaller growers, without spraying machines, may have the work done on contract charges by the county agricultural committees. Growers receive guidance from research work done at stations at East Malling, Kent; Long Ashton, Bristol; and Merton, Surrey. National fruit trials are conducted by the Royal Horticultural Society at Wisley, Surrey, in cooperation with the ministry of Agriculture. **H. V. Taylor, D.Sc.**

**PRESERVATION OF FRUIT.** The most common method is to boil the fruit with sugar until it becomes jam (*q.v.*). But it can be crystallised, the sugar preserving it as in jam; it can be put through a drying process, so that the moisture is entirely evaporated, decay being thus prevented; or it can be hermetically sealed in vessels with syrup or water. The natural flavour and colour are best preserved by the last method, which can be carried out on a small scale at home quite as well as in the factory. That the process was employed by the Romans is proved by sealed jars found in the ruins of Pompeii, with the fruit intact.

#### Bottling and Canning

In bottling, the fruit may be boiled in the bottles, the vessels filled up with water or syrup, and the caps or stoppers, fitted with rubber rings to render them airtight, screwed on before the cooking process. Alternatively the bottles may be sealed with caps after the boiling.

In preserve factories, tins are more extensively used than bottles, being cheaper, less breakable, and more adaptable to mechanical processes. They are specially prepared with a lacquer coating inside, which prevents possible action of the fruit acids on the metal. The tins are filled with fruit and syrup, the lids rapidly fastened on by machinery, the closed tins then being processed or cooked in huge tanks of water brought to the necessary temperature. After

cooking, they are allowed to cool, washed, and labelled. Bottled fruits are prepared in the same way, but greater care has to be exercised owing to the fragile character of glass, and there is more manual work in the packing, which explains why bottled fruits are dearer than tinned. Tinned fruits are as safe and wholesome as bottled fruits.

#### Fruit Available the Year Round

Properly preserved as described, the fruits have almost the same flavour as when fresh, and the choicest orchard products, which used to be available for only a few weeks in the year, can now be enjoyed during the whole twelve months, as can the finest imported fruit. Canned or bottled fruit will keep in a perfect condition for years, if the sealing is really hermetic. Sometimes, however, where a joint is defective, fermentation sets up, and the tin becomes "blown," *i.e.* the gases developed inside cause the tin to swell outwards, and, if left alone, it will eventually burst.

Glacé fruits are first boiled in a strong syrup, and then dried in a moderate oven. The syrup in which the fruit was boiled is then raised to a temperature of about 233° F., and when it is cooled somewhat, the fruit is dipped in until it is well coated, after which it is dried. Crystallised fruits are similarly treated, but when taken out of the syrup are rolled in crushed loaf sugar before being dried.

**Fruit Bat.** Family of bats (*Pteropodidae*). Much larger than the rest of the order, they are characterised by feeding on fruits instead of insects. The molar teeth are modified in form to suit the change of diet. The head is somewhat fox-like, whence the animals have derived their popular name of flying foxes. Including numerous species, they are found in S. Asia, Australia, Madagascar, and most of the islands of the Pacific Ocean. *See* Flying Fox.

**Fruiters' Company.** London city livery company. First mentioned in 1292, and granted its first charter in 1605, it took part in the colonisation of Ulster in 1613, and has done much to encourage fruit culture in England, and to



Fruiters' Company arms

promote the interests of the fruit trade. Its offices are at 16, Old Broad Street, E.C.2.

**Fruit Fly.** This pest is described under *Drosophila*.

**Fruit Pigeon.** Name given vaguely to a number of large, handsomely coloured pigeons of

the subfamily *Trogoninae*, which feed mainly on fruit. The beak is adapted that it can be widely distended at the base in order to swallow fruits whole. Found throughout S. Asia and Australia, the birds damage crops.



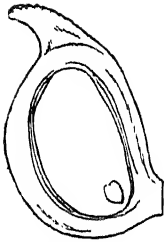
Fruit Pigeon of Oceania, *Carpophaga oceanica*

**Frunze.** Russian city, capital of Kirghiz S.S.R. and of a region of the same name. It lies 10 mi. S.W. of the Chu river, about 300 E.N.E. of Tashkent, on a branch of the Turk-Sib rly. Built 1873 as a Russian fortress in Turkistan, and named Pishpek, it grew into a town after the completion of the rly. in 1924, and in 1925 was renamed in honour of M. V. Frunze (*q.v.*). It produces machinery and other metal goods, textiles, furs, leather, and canned foods. Pop. (est.) 1930, 140,000.

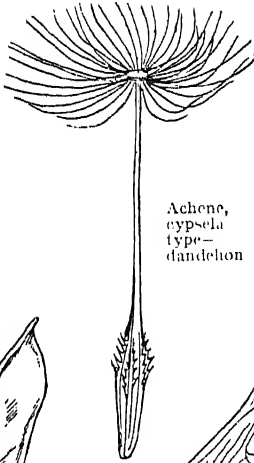
Frunze region, with an area of 6,000 sq. mi., is drained by the river Chu and its tributaries, which have been channelled for irrigation. Hemp and other fibre plants, sugar beet, and fruit are grown. There are sugar refineries, flour mills, meat packing and fruit-canning plants, etc., and lead is mined. Pop. (est.) 1,000,000.

Another Frunze, called Kadamyjay until 1940, is a mining and antimony mining town in Osh region, Kirghiz S.S.R., 160 mi. S.W. of Tashkent.

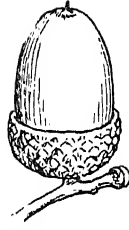
**Frunze, Mikhail Vassilievich** (1885-1925). Russian soldier. He was born in Turkistan, at Pishpek (renamed Frunze, *q.v.*) and educated at St. Petersburg, where he joined the Bolsheviks. After a period of imprisonment Frunze was banished to Siberia in 1914, but escaped and took part in the fighting in Moscow during Nov., 1917. An army commander on the eastern front in 1918, he later directed operations against Admiral Kolitchak, and took command of the troops that drove Wrangel out of the Crimea. Vice-president of the revolutionary military council in 1924, Frunze became president and people's commissar for military and naval



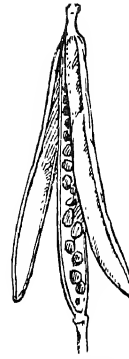
Achene—buttercup  
(section)



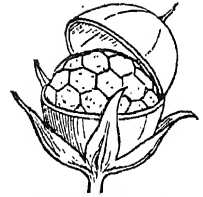
Achene,  
cypsela  
type—  
dandelion



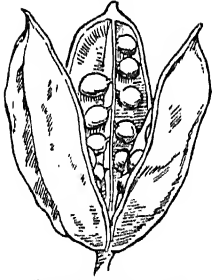
Nut—acorn of oak



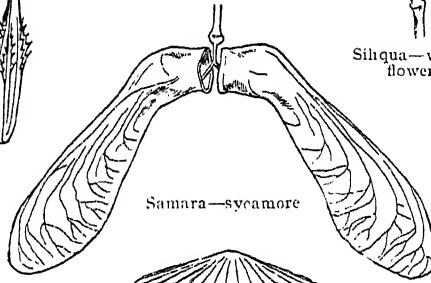
Silique—wall-  
flower



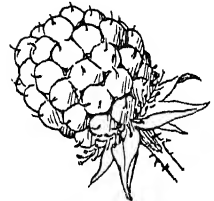
Capsule — pimpernel,  
splitting cleanly across



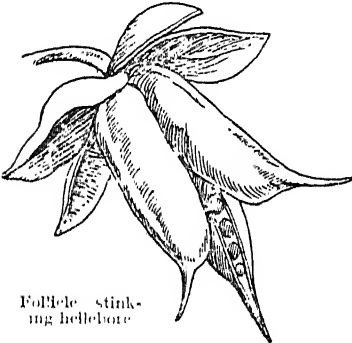
Capsule — iris, split-  
ting into 3 valves



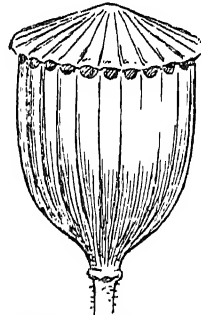
Samara—sycamore



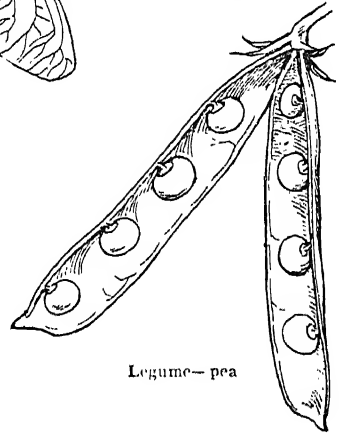
Compound drupes—  
blackberry



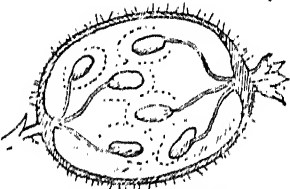
Follicle—stink-  
ing hellebore



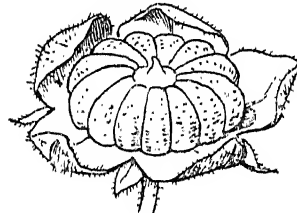
Capsule — poppy head  
with apertures for escape  
of seeds



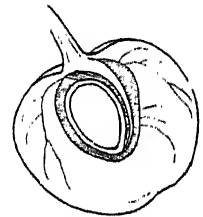
Legume—pea



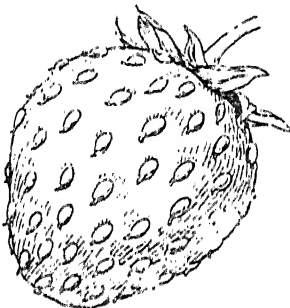
Berry—gooseberry in section  
showing seeds in pulp



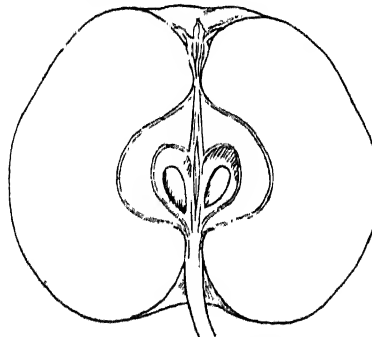
Schizocarp —“cheese” of mallow



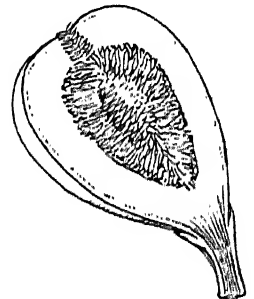
Drupe—cherry in sec-  
tion, with seed in stone



False fruit—strawberry, fleshy re-  
ceptacle with numerous achenes



Pome—apple in section



Hypanthodium—fig in section

# FRUIT: EXAMPLES OF THE PRINCIPAL RECEPTACLES FOR SEEDS



affairs in Jan., 1925, but died the same year. The Red Army military academy was renamed after him.

**Frustration.** Term used in psychology for the state of mind which occurs when instinctual expression is blocked either by conscience or by the environment, and no gratification is available as a substitute. All frustration causes resentment, either overt or repressed; a fact which has important bearings on the theories of ethics and education.

**Fry.** The young of salmon, trout, and other fish, at the stage when the yolk-sac which surrounds them after hatching has disappeared. The phrase "small fry" in general use comes from this term.

**Fry, CHARLES BURGESS** (1872-1956). A British athlete and journalist. He was born at Croydon, April 25, 1872, and educated at Repton and Wadham College, Oxford, where extraordinary athletic prowess brought him three blues and the captaincy of cricket and Association football. A brilliant and highly scientific batsman, he played for Surrey in 1891, for Sussex from 1891, and for Hampshire, 1909-21; he exceeded 3,000 runs, with six successive centuries, in 1901, and captained England in 1912 in the triangular series of test matches against Australia and S. Africa. Fry played Association

football for England, and in 1893 set up what was then a world record with a long jump of 23 ft. 6½ ins. In 1907 he helped to introduce the game of diabolo.

As a journalist, he ran C. B. Fry's Magazine, 1901-14, was athletic editor of *The Captain*, 1899-1905, and later wrote on cricket for *The Evening Standard*. An honorary commander, R.N.R., he was director of the nautical school training ship *Mercury* (q.v.), 1908-50. His publications included a novel, *A Mother's Son*, 1907, with descriptions of hunting, steeplechasing, and cricket; *Cricket*, 1912; *Life Worth Living*, 1939. He died in London Sept. 7, 1956.

**Fry, CHRISTOPHER** (b. 1907). English dramatic poet. Born at Bristol, Dec. 18, 1907, he was educated at Bedford Modern School and went on the stage in

1927. He attracted attention with a witty verse-play *A Phoenix Too Frequent* (Mercury theatre, 1946). Later successes in this style were *The Lady's Not for Burning*, with John Gielgud, 1949, and *Venus Observed*, produced by Laurence Olivier, 1950. Other works included *A Sleep of Prisoners*, 1951; *The Dark is Light Enough*, with Edith Evans, 1954; *Tiger at the Gates* (trans. of J. Giraudoux), 1955.

**Fry, SIR EDWARD** (1827-1918). British lawyer. Born Nov. 4, 1827, of a well-known Quaker family, he



Sir Edward Fry,  
British lawyer  
*Thoburn & Fry*

was educated at Bristol and London universities. In 1854 he became a barrister, in 1869 a Q.C., and in 1877 a judge of the court of chancery. He served on the bench with distinction and dignity for fifteen years, after 1883 as a lord justice of appeal. After his retirement in 1892 he did varied public work. He was made permanent member of the Hague tribunal, and represented his country at the conference of 1907. Fry presided over two commissions on Irish affairs, one on land, in 1897, and one on university education. He died Oct. 18, 1918.

**Fry, ELIZABETH** (1780-1845). English prison reformer. Born at Gurney Court, Norwich, May 21, 1780, a daughter of John Gurney, Quaker and banker, she was brought up in cultured surroundings, and married Joseph Fry, another Quaker, in 1800. In 1813 Mrs. Fry paid her first visit to Newgate prison. The misery and filth she saw there determined her to devote herself to improving the lot of the prisoners, especially the females, and the rest of her life was spent in this cause.

In 1817 she formed an association for their improvement, and, like Howard, extended her interest to prisons in other parts of Europe. So successful was she that in 1818 she was called before a committee of the house of commons, and thanked for her work. She organized night shelters for the home-

less and a visiting society for the relief of distress. She died at Ramsgate, Oct. 12, 1845.

**Bibliography.** *Memoirs*, ed. by her daughter, 1847; *Life*, G. Lewis, 1910; *Journeys on the Continent*, ed. R. Johnson, 1931; E. P. Quaker Heritage, J. Whitney, 1937.

**Fry, JOSEPH** (1728-87). British manufacturer. Born at Sutton Benger, Wiltshire, he was apprenticed to a doctor at Basingstoke. He settled in Bristol, where he soon had a good practice, but his fame rests upon his business enterprises. He founded the business of cocoa and chocolate manufacturers, now the firm of J. S. Fry & Sons, and also became a typefounder. This concern, having been transferred to London as Joseph Fry & Sons, was responsible for useful typographical innovations, and printed some Bibles. Fry was also interested in soap and chemical works. Like many of his descendants, he was a member of the Society of Friends. He died March 29, 1787.

**Fry, ROGER ELLIOT** (1866-1934). British artist and critic. Son of Sir Edward Fry (q.v.), he was educated at Clifton and Cambridge, where he took his degree in science. He then turned to art, becoming co-editor of *The Burlington Magazine*, an authority on Italian



Roger E. Fry,  
British artist  
*Thoburn & Fry*

art, and a vigorous apologist of Post-impressionism. He helped to organize the first exhibition in London of Post-impressionism, though it was Desmond MacCarthy who coined the term. Fry wrote a study of Giovanni Bellini, 1899; *Vision and Design*, 1920; *Transformation*, 1926; *Cézanne*, 1927; *Reflections on British Painting*, 1934; and edited Reynolds's Discourses, 1905. In 1908 he was European art adviser to the Metropolitan Museum, New York. He became Slade professor of fine art at Cambridge in 1923. As a painter he was a leading member of the London group (q.v.). He died as the result of a fall, Sept. 9, 1934. A biography by Virginia Woolf was published, 1940.

**Fry, (SARA) MARGERY** (b. 1874). British social worker. Daughter of Sir Edward Fry, she was educated at Miss Lawrence's school, Brighton (afterwards Roddenn) and Somerville College, Oxford, at



Margery Fry  
*Thoburn & Fry*

which college she was librarian, 1898-1904, and principal, 1926-31. She was warden of University House, Birmingham, 1904-14, and a governor of the B.B.C., 1938-39. A leader of the movement for penal reform for child delinquents, she was secretary of the Howard League, 1919-26.

**Fryatt, CHARLES (1872-1916).** British sailor. Born Dec. 2, 1872, he entered the service of the G.E.R.



Charles Fryatt,  
British sailor

as an able seaman. In 1904 he became chief officer, obtained his master's certificate in 1905, and in 1913 was promoted captain. When the First Great War broke out he

was in command of the steamer *Brussels* on the service between Holland and England. He was attacked and escaped from a German submarine on March 3, 1915, but on the 28th was attacked again, and rammed the U-boat.

Bound from Holland to Tilbury on June 23, 1916, he was captured by a German destroyer, taken to Zeebrugge, and thence to Ruhleben. Removed to Bruges, he was tried by a court-martial on July 27, the evidence of his log for March 28 being produced against him, was condemned as a franc-tireur, and shot the same evening. This was an obvious injustice, as Fryatt was wearing uniform and was in government employ. Fryatt's body was brought to England and buried at Dovercourt, July 9, 1919.

**Fuad I (1868-1936).** Egyptian king. He was born at Cairo, March 26, 1868, youngest son of the khedive Ismail Pasha and brother of the first sultan of Egypt, Hussein Kamil, whom he succeeded Oct. 9, 1917. At the termination of the British protectorate in 1922 he was proclaimed king. After the anti-British movement of 1927-28, he dismissed the discredited nationalist ministry of Nahas Pasha and installed a liberal government. Further trouble with the nationalist Wafd party led to the king's promulgation of a new constitution, 1930, vesting in himself almost unlimited powers. This caused such serious discontent that towards the end of



Fuad I,  
King of Egypt

1934 Fuad was forced to restore the constitution of 1923. He died April 28, 1936, and was succeeded by his son Farouk (*q.v.*).

**Fuchs Case.** British espionage trial. Born in 1911, at Rüsselsheim, near Frankfurt-on-Main, Germany, the son of a pacifist clergyman, Karl Emil Julius Fuchs was educated at Leipzig and Kiel universities, and joined the German Communist party in 1932. In 1933 he came to England as a refugee, continuing his studies at Bristol and Edinburgh. After internment, 1940-42, he was given work in connexion with atomic research, and became a naturalised British subject in 1942. He went to the U.S.A. with a British atomic mission in 1943. Returning in 1946, he was made head of the theoretical division of the atomic energy establishment at Harwell.

In 1949 the British govt. was told by the U.S.A. that there had been some leakage of information while the British mission had been in America. Suspicion was narrowed down to Fuchs, who was arrested Feb. 3, 1950, and charged under the Official Secrets Act, 1911. He admitted that he had been in contact with persons unknown to him who passed on to the Russian govt. information he had supplied. He had accepted only one token payment of £100, and his sole explanation of his conduct was that he had had complete confidence in Russian policy and had believed that Russia would build a new world. Since the end of the Second Great War he had revised his opinions, and had had misgivings as to the course he had been pursuing. Pleading guilty at his trial, March 1, 1950, he was sentenced to 14 years' imprisonment.

**Fuchsia.** Hardy and half-hardy flowering shrubs, of the family Onagraceae. They are natives of



Fuchsia. Flowers of  
the double fuchsia

The shrub is named after the German botanist L. Fuchs (1501-66).

**Fuchsin.** Aniline dye formerly of great commercial importance, but now little used owing to its poor resistance to light. Known also as magenta red, roseine, aniline red, rubine, azaline, harmaline, and erythrobenzine, it was discovered by Natanson in 1856. The two methods by which it is made are (1) the "arsenic acid melt" process, consisting of the oxidation of a mixture of aniline, orthotoluidine and paratoluidine, known as "aniline for red," with arsenic acid; and (2) the nitrobenzol process, in which "aniline for red" is heated with nitrobenzene, orthonitrotoluene, and para-nitrotoluene in the presence of iron and hydrochloric acid. The chief use today is for stains for microscopy.

**Fucino.** Former lake of Italy, in the dept. of Abruzzi e Molise. It is 2 m. E. of Avezzano and is now reclaimed, being the largest lake ever drained by artificial means. With a circumference of about 36 m. a depth of over 60 ft., and an alt. of 2,172 ft., it had no outlet, and was liable to great and dangerous fluctuations in volume. To remedy this the Emperor Claudius, in A.D. 52, had a tunnel, 3½ m. in length, cut so that the water could find its way into the river Garigliano or Liri (anc. Liris). This fell into disrepair, but Trajan repaired it.

In 1854 the Roman banker, Prince Giulio Torlonia, for the consideration that the land reclaimed should become his property, undertook to make a new channel. This he did at an enormous expense, and the lake was finally drained in 1876. The reclaimed area of 40,000 acres was laid out in a series of model farms, mainly occupied by tenants of the Torlonia estates. During the Second Great War, the area was cleared of Germans in June, 1944, by N.Z. troops.

**Fucoid** (Lat. *fucus*, seaweed, Gr. *eidos*, likeness). Filamentous structure found in rocks of all ages. They are supposed to be remains of seaweed-like plants, but are probably worm-casts or totally unconnected with any organisms. They are common in Cambrian rocks. Fucoid beds are a group of shales and mudstones of Cambrian age in the N.W. of Scotland.

**Fucus** (Lat., seaweed). Genus of brown seaweeds of the family Fucaceae (class Phaeophyceae). They are abundant on all rocky shores in shallow water. They have long, leathery fronds, often exposed for hours at low water, and forming a large percentage of the seaweed gathered for mairing

the land. Examples are the bladder-wrack (*F. vesiculosus*) and the saw-edged wrack (*F. serratus*).

**Fuegians.** Indian tribes inhabiting Tierra del Fuego and neighbouring archipelagoes. They in-

clude the Yahgan in the S., the Alakuluf in the N. The Ona, their northern neighbours, are a branch of the Patagonians to the north of the Strait of Magellan. They are few in number.

**Fuego.** Active volcano of Guatemala, Central America. It is 45 m. S.W. of Guatemala City and 21 m. W. of the Volcán de Agua. Its snow-capped cone rears to a height of 12,577 ft., and there was a considerable eruption in 1880.

**Fuel.** Matter which produces heat by the chemical combination of its constituents with oxygen, in the process commonly known as combustion. With the exception of hydrogen gas, all fuels consist of more or less organic compounds of carbon and hydrogen, with the occasional addition of sulphur and some incombustible matter. A number of intermediate reactions take place during the combustion of a hydro-carbon fuel, but if the combustion is complete the final result will be carbon dioxide ( $\text{CO}_2$ ) and steam ( $\text{H}_2\text{O}$ ) mixed with all the nitrogen and any unconsumed oxygen in the air supplied for combustion.

#### Heat Necessary for Combustion

The heat generated by the combustion of 1 lb. of hydrogen with a minimum of 8 lb. of oxygen is 62,100 British thermal units; 9 lb. of steam is produced. The complete combustion of 1 lb. of carbon with a minimum of 2.67 lb. of oxygen generates 14,590 B.Th.U.; 3.67 lb. of carbon dioxide is produced. For each lb. of oxygen required approximately 5 lb. of air must be supplied, so that 1 lb. of fuel oil containing 0.85 lb. of carbon and 0.14 lb. of hydrogen must be supplied with at least 12 lb. of air if combustion is to be complete. In this case the heat generated would be 21,000 B.Th.U., but about 2,000 of these units are expended in splitting up the hydro-carbon compounds in the fuel.

If there were no loss of heat by radiation or conduction while combustion is taking place, the rise of temperature from 13 lb. of combustion products would be about 5,500 deg. F. In practice,

however, heat is lost by radiation to and possible contact with relatively cold surfaces while combustion is proceeding, the amount lost depending upon the rapidity with which combustion takes place, and the actual rise in temperature may be very much less. Also if air in excess of that required to ensure complete combustion is supplied, the rise of temperature is

less than the maximum possible. If the air supply is pre-heated, the actual temperature at the end of combustion may be very appreciably higher than with a cold air supply.

#### Rate of Transmission of Heat

The rate of transmission of heat (B.Th.U. per sec.) is proportional to the area of the radiating surface (e.g. a glowing fuel bed or a luminous flame) and is also proportional to the fourth power of its absolute temperature (Fah. deg. + 460). Thus a surface at 3,000 deg. F. (3,460 deg. abs.) will radiate 72 p.c. more heat per sec. if its temperature is raised to 3,500 deg. F. (3,960 deg. abs.). Luminous flames, which contain unconsumed hydro-carbon vapours at a high temperature, radiate considerably more heat than non-luminous flames, but must not be brought into contact with colder surfaces or cooled by an excess of cold air before combustion is completed, otherwise carbon is deposited, either alone or in combination with hydrogen, producing smoke and deposits of soot and tarry matter on the surfaces receiving heat.

The high temperature gaseous products of combustion, which consist mainly of carbon dioxide, steam, and nitrogen plus unconsumed oxygen, radiate comparatively little heat, even at high temperatures: they give up their heat only in actual contact with colder surfaces. With steady flow, only a small part of the gas

comes into contact with the surface to be heated, the heating of which is therefore correspondingly slow; for this reason, vigorous turbulence is desirable. There is also a tendency for a very thin layer of the gases, diminishing in thickness as turbulence increases, to adhere to the surfaces; this has a retarding effect on the transmission of heat by conduction. (A film of air 0.001 in. thick has a resistance equal to that of 4 ins. of steel plate.) A deposit of soot or ash has a similar effect.

#### Incomplete Combustion and Waste

Incomplete combustion, denoted by the presence of carbon monoxide (CO) in the products of combustion, may result in appreciable loss of heat. As little as 1 p.c. of CO by volume in the cooled products represents a loss of approximately 7 p.c. of the heat value of the fuel and counterbalances any saving effected by reduction of excess air and consequent reduction of loss in the escaping products. Absence of smoke is not necessarily an indication of complete combustion. In complete combustion may result

(a) if the total air supply is insufficient, (b) if the mixing is inadequate, producing local deficiencies in oxygen. With solid fuels, apart from the effects of volatile constituents, only the air which is in actual contact with the surface of the fuel takes part in the primary combustion, and this must be sufficiently rapid to maintain the fuel surface at ignition temperature in spite of the cooling effect of the current of air. Thus, the fuel bed must be sufficiently compact to prevent large quantities of air passing through without contact, and sufficiently porous to allow the requisite quantity of air to pass through the bed with a high degree of turbulence. The amount of air passing, and consequently the rate of combustion, depend upon the pressure difference between the top and bottom of the bed, i.e. the draught, and upon the thickness of the bed.

Fuel may be solid (wood, coal, briquettes, coke, vegetable waste), liquid (petrol, alcohol, light and heavy fuel oils) or gaseous (coal gas, producer gas, blast furnace gas, hydrogen). Their suitability for a particular purpose depends upon cost of production, cost of transport and delivery to bunkers, space required for storage, convenience of handling to furnaces and adjustment of supply to requirements, maintenance of uniformity in combustion, formation



Fuegians. Indian and his squaw wearing blankets

of deposits on heating surfaces, facilities for removal and disposal of ash where this is formed.

Coal, the most important solid fuel, is also the most complex and variable in its constitution (see Coal). The percentage of incombustible matter (oxygen and ash) present in a particular grade of coal is important, since for each ton of coal burned containing 92 p.c. of combustible material, arrangements must be made for the removal of 8 p.c., or about 180 lb., of ash. If the ash is fusible (i.e. has a low fusing temperature) it may form clinker, which will tend to stick to the grate bars and obstruct the flow of air, necessitating frequent cleaning of the fire. Some of the combustible material may also be lost, enclosed in the fused ash. On the other hand, a friable ash disintegrates readily, and with high rates of draught dust may be deposited on the heating surfaces, checking the flow of heat. The calorific value, i.e. the heat obtainable, from the complete combustion of 1 lb. of coal will depend upon the ash percentage. If the calorific value of the combustible portion is 15,000 B.Th.U. per lb. then, with 10 p.c. of ash, the actual calorific value of 1 lb. of the coal is 13,500 B.Th.U. The design of the stoking appliance and the grade of coal must be suited to one another, and heating appliances should be readily adaptable to differences in the quality of the coal used.

#### Solid and Pulverised Fuel

The rate of burning of a solid fuel depends largely upon the amount of surface exposed to the air supply. A one in. cube has a total surface of 6 sq. ins., but if this cube is broken up into cubes of  $\frac{1}{16}$  inch side, the total surface is increased to 600 sq. ins. For certain purposes where rapid burning is desirable, pulverised fuel is used, in particular for firing cement-burning kilns, metallurgical furnaces, and steam boilers. In America, it is largely used suspended in mineral oil (colloidal fuel), various methods of treatment ensuring that the particles do not separate.

Coal gas is produced from bituminous coal by heating in a retort in the absence of air (see Gas). The solid residue, coke, is a useful commercial fuel. So-called soft coke, the residue from low-temperature carbonisation, contains more volatile matter and hence is more suitable for domestic fuel than hard coke; the majority of the

special fuels marketed under trade names are products of low-temperature carbonisation.

Reckoned in cost per unit of calorific value, gas is considerably more expensive as a fuel than coal; but it can be burned more efficiently than coal, gas fires and furnaces require less attention, and need no bunkers or facilities for cleaning and ash removal.

Where large quantities of gas are required at comparatively cheap rates for metallurgical purposes or power production, producer gas, generated on the site, is frequently used. This is produced by passing air, usually accompanied by a certain amount of steam, through a thick bed of incandescent fuel (see under Gas). It has a lower calorific value than coal gas, but this is partly counter-balanced in use by the fact that for combustion it requires much less air.

#### Chief Liquid Fuel

Mineral oil is the chief liquid fuel, but though it occurs naturally it is rarely used in its natural state. (See Petroleum.) By gradually heating the natural oil, products are obtained varying from high grade petrol, through lower grade petrols and kerosene to a residue which is used as a fuel oil for compression ignition engines, for heating and for steam raising. Advantages of oil fuel compared with coal are described under Fuel Oil.

Coke and anthracite are relatively smokeless. Coke, though cheaper in cost per ton, has a lower calorific value, is bulkier than coal, and has a higher ash content. It is also more difficult to burn and needs well scrubbing with air. The ignitability of coke depends upon its source and largely on the size of the lumps. With large lumps the exposed surface is too small for rapid combustion, while with very small lumps the closer packing of the fuel retards the passage of air through the fuel bed.

During the mining, handling, and transport of coal, appreciable quantities of slack and dust are produced, which have a comparatively high calorific value (after separation of dirt by washing) and can be utilised if mixed with a bituminous binder and moulded into briquettes (usually egg-shaped). Their ash content is somewhat high, but they burn readily and uniformly, and are suitable for domestic fires.

For domestic heating and cooking, coal is by far the cheapest fuel, reckoned in cost per 100,000 B.Th.U. of calorific value, but a much larger percentage of the heat

is wasted than with gas or electricity, particularly with open fires, so that to achieve a given result, reckoned in physical comfort or convenience, the difference in cost is much less pronounced.

The world's coal and oil are being used up at a constantly increasing rate and, being irreplaceable, must eventually become exhausted. Alcohol produced from grain and potatoes, which was an important fuel in Germany during the Second Great War, may become a fuel of world importance; while the harnessing of atomic energy provided new sources of heat and power.

A. T. J. Kersey, M.I.Mech.E.

#### Fuel and Power, MINISTRY OF.

British government department established in 1942 to coordinate the fuel supplies of the U.K. It replaced the ministry of Mines, absorbed the Mines and Petroleum department of the board of Trade, and took over responsibility for gas and electricity supplies. It assumed full control over the operation of all coalmines and the allocation of the coal raised. By an act of April, 1945, the ministry continued in being after the Second Great War, the minister's first important post-war duty being to pilot through the house of commons the Coal Industry Nationalisation Act, 1946. Under nationalisation the ministry became responsible for the running of all coalmines from Jan. 1, 1947; for the generation and supply of electricity from April 1, 1948; and for the manufacture and supply of gas from May 1, 1949. Its name was changed in 1957 to the ministry of Power when it was made responsible also for development of atomic energy.

**Fuel Oil.** Term for oil used as a source of heat and power. Although this term properly refers to all oils which are used as a source of heat and power, it is commonly restricted to those oils burned in industrial furnaces or under boilers. Fuel oil varies in grade from exceptionally thick, black oil which has to be preheated before it can be handled, to pale oil of low viscosity comparable in general appearance with that used for lubricating light machinery. In terms of viscosity, this is a range from about 7,000 seconds to 40 seconds Redwood No. 1 at 100°F. Petroleum residues and distillates form the bulk of fuel oil, but some coal oils are also used. In general, it may be said that the heavy, viscous oils are residual products which remain

after distillation from crude petroleum is completed, and that the light oils are distillates; but many products, such as residues from the cracking plant and from lubricating oil manufacture, are frequently blended with normal residues and distillates.

The most important properties of a fuel oil are those affecting the ease with which it passes from tank to burner (viscosity and pour point) and the operation of the burner itself (carbon residue). Burners such as are fitted to small domestic appliances vaporise the oil by causing it to come in contact with a hot surface; the vapour then mixes with air drawn in by natural chimney draught. This system requires an oil of low viscosity and low pour point, so that the gravity feed from the tank will be maintained in all conditions, and also a low carbon residue, for otherwise appreciable carbon deposits will form on the vaporising surface and reduce its efficiency. These conditions are satisfied by relatively light distillate fuels.

#### Use of Residual Fuels

Atomising burners, by means of steam or air jets, centrifugal action, or high pressure oil jets, break the oil into a fine spray, which promotes complete combustion, and so can deal with residual fuels having a high carbon residue, provided that the mechanical design of the burner obviates the possibility of the oil being decomposed by heating before it is atomised. Burners of the type are used in all medium and large size furnaces.

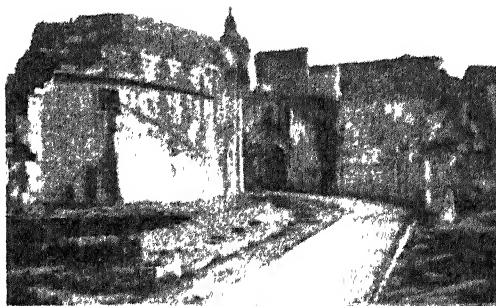
Most petroleum fuel oils have a calorific value of between 18,000 and 20,000 B.Th.U. to the lb. Coal tar oils range between 16,000 and 18,000 B.Th.U. to the lb.

Though the cost of liquid fuel is higher than that of solid fuel, it has the following advantages: it has a higher calorific value, hence smaller storage space is required; it is cleaner and easier to use and to handle; its combustion is simpler to control; it has virtually no ash, which means that no steps have to be taken to remove and dispose of waste. For these reasons it is widely used for marine work, in the metallurgical and ceramic industries, in the preparation of foodstuffs, for portable driers and heaters in agriculture, and in jet and gas turbine engines. Storage in steel tanks is normally no problem because the high flash point—a statutory minimum of 130° F.—makes special precautions unnecessary. Flash point determinations should be made, how-

ever, to guard against possible admixture of gasoline or kerosene. Steam or hot water pipes must be installed in storage tanks for viscous oils, especially those with a high pour point, to render the oil sufficiently fluid for pumping.

**Fuenteovejuna.** Town of Spain, in the prov. of Córdoba. It stands on an eminence in a fertile district, 45 m. by rly. N.W. of Córdoba, and is encompassed by ramparts. It trades in honey, wine, fruit, grain, and cattle; and leather, bricks and tiles, preserved meat, and soap industries are carried on. A stock fair is held yearly. Near by are silver-lead mines, and stone quarries. Fuenteovejuna is said to be ancient Mellaria, famed for its honey. Pop. (1950) 17,001.

**Fuenterrabia.** City of Spain, in the prov. of Guipuzcoa. It stands on a peninsula, near the mouth of



Fuenterrabia, Spain. The walled fortress which guarded the entrance to the old city

the river Bidasoa, on the opposite side to France, 10 m. E.N.E. of San Sebastian on the Paris-Madrid rly. It is a picturesque walled town, with a 10th century castle, narrow streets, and curious houses. The modern part, facing the estuary, is a popular summer resort, with fishing quarters and industrial suburbs. Ropes, fishing nets, and paper are made, and there are also flour and saw mills.

Fuenterrabia was taken several times by the French, but its most noted siege was in 1638, when the French under Condé were defeated here. To celebrate this event a festival is held every year on Sept. 8. It was opposite Fuenterrabia that Wellington crossed the Bidasoa, Oct. 8, 1813. Pop. (1950) 7,363.

**Fuentes d'Onoro, BATTLE OF.** Fought in the Peninsular War between the English and the French, May 3 and 5, 1811. Fuentes is a village in the prov. of Salamanca, Spain. It stands on a hill, near the Portuguese frontier, 15 m. by rly. W.S.W. of Ciudad Rodrigo. The

battle was fought because Wellington was blockading that fortress, and the French, under Masséna, were marching to relieve it. Although inferior in numbers, Wellington decided to fight, and he drew up his 32,000 men behind a stream flowing through a deep ravine. One French division attacked on the 3rd, and there was some savage fighting around the village, but at the end of the day practically no ground had been won or lost.

With about 10,000 infantry, and 5,000 cavalry, Masséna made his great attack on the 5th. His intention was to turn the British right, but, foreseeing this, Wellington extended his front until it was 7 m. long. There was some fighting, infantry and cavalry mingled in a confused encounter, the British in general being worsted.

Gradually, in spite of great gallantry, they were forced back, and, as desired, the right was turned, and the 7th and light divisions, which had borne the brunt of this attack, were separated.

To prevent, therefore, a more serious disaster, a new front was decided upon. The 7th division crossed the river Turones, while the light division resisted the oncoming foe, squares of infantry slowly retreating before surging masses of horsemen. At length the new line was formed and an artillery duel ensued. Meanwhile, there was a terrific battle in Fuentes itself, where the houses were used to good purpose. From part of this the few British troops were driven, but, strongly reinforced, they managed to keep to some of their positions until the evening, when the battle ended without a decision. The English and their Spanish auxiliaries lost about 1,500, including 300 prisoners; the French casualties were somewhat less.

**Fuero** (Lat. *forum*). Spanish word meaning a code of laws, or set of privileges, something like the English charter. The Spaniards had many of these fueros, the most important being the Fuero Juzgo, the national code of Castile, taken from the Visigoths, but several times revised. It was not known at first as a fuero, for the word

only came into use in the 10th or 11th century, the first *fuero* being probably the one granted to Leon in 1020. There were various local and municipal *fueros*, by which towns and provinces enjoyed certain privileges, such as the right to choose their own overlord. The three Basque provinces had *fueros* which made them largely self-governing until 1876, when these privileges were taken away. Portuguese towns had also their *foraes*. See Charter.

**Fuerteventura.** One of the Canary Islands. It lies S.W. of Lanzarote and N.E. of the Grand Canary; area 664 sq. m. Mountainous and barren, it has only two fresh-water springs, and suffers from prolonged periods of drought. The inhabitants are mostly fisher-folk. The capital is Santa Maria de Betancuria, and Cabras is the chief port.

**Fugger.** Name of a German family of merchants. Johann Fugger, its founder, settled in Augsburg about 1370. A weaver from the neighbourhood, he soon became a merchant and a citizen. His son and grandsons carried on his business as merchant and money-lender and became very rich.

Jacob Fugger (1459-1525) was perhaps the most notable member of the family. With his brothers he had mining, banking, shipping, and other interests nearly all over Europe, became the banker of the Hapsburg family, and found the money which secured the imperial throne for Charles V in 1519. His nephew Anton took advantage of the discovery of America to add to his wealth, while the family, among other ventures, farmed the silver and the quicksilver mines in Spain that belonged to Charles V.

The succeeding members were less interested in business, but remained personages of wealth and importance. They were divided into various branches; some entered the Church, at least two becoming bishops; others were soldiers, others scholars and patrons of art. The Fuggers maintained correspondents in all parts of Europe, who kept them in touch with events. Some 36,000 pages of their so-called Fugger News-Letters are preserved in the Vienna state library, and give an illuminating picture of the period 1568-1605. Two selections were translated into English by von Klarwill, 1923 and 1928.

Three branches of the family continued, and before the changes of 1918 the head of each was a member of the Bavarian upper

house. One Fugger was made a prince in 1803; the others became counts.

**Fugitation** (Lat. *fugitare*, to flee). Term used in Scots law for the act of declaring a person a fugitive from justice. If a person charged with a crime fails to appear to answer the charge, he can be declared outside the law. His goods then become the property of the crown.

**Fugitive Offenders Act, 1881** (Lat. *fugitivus*, runaway). Law operative throughout the British Commonwealth. By it a person accused of a crime in any part of the king's dominions may be arrested in any other part and sent to where he is wanted. The Act applies only to offences punishable by imprisonment with hard labour or the equivalent for 12 months or more. See Extradition.

**Fugitive Slave Laws.** Two laws of the U.S.A. providing for the recovery of runaway slaves. The first, passed in 1793, enabled the owner of a slave who had taken refuge in a non-slave state to recover his property on application to a magistrate for a warrant. As the anti-slavery feeling grew in intensity in the northern states the Act was evaded or nullified by the passing of state laws forbidding state officials to assist in enforcing this law of the federal government. After insistent demands from the slave-owning states, a new law was passed in 1850, by which the obligation was imposed on federal officials to enforce the law. See Slave Trade.

**Fugleman** (Ger. *Flügel*, a wing). Corruption of *Flügelmann*, i.e. a soldier on the wing of a body of troops. At drill he advanced in front of the line to give the time in the exercises with the musket.

**Fugue** (Fr. from Ital. *fuga*, flight). Important form of contrapuntal music akin to the round and canon (*q.v.*), but much more free. Here are only given definitions of the chief terms used in connexion with fugue-form, readers being referred to musical works for full elucidation. The subject is the chief theme, announced by all the voices or parts in turn, but it is called the answer when it has the

dominant as its key-centre instead of the tonic; the answer is called real when it is an exact transposition of the subject, or tonal when certain modifications take place in order to avoid a too great divergence from the original key. The countersubject is the counterpoint which accompanies later entries of subject and answer. The first complete set of entries of all the parts is the exposition. Subjects are sometimes inverted, augmented, or diminished.

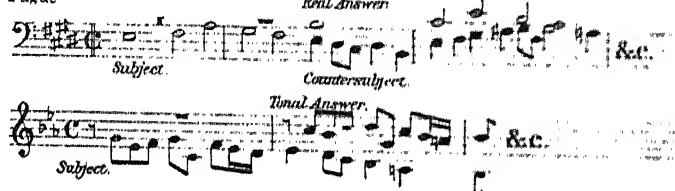
A counter-exposition is a further set of entries in a different order from that of the exposition. An episode is a free section introduced as a relief from the stricter portions of a fugue. A stretto contains entries of subject and answer at shorter time-intervals than at first. A pedal, a long sustained note, usually the dominant or tonic, often accompanies the stretto, and is also used independently. J. S. Bach was the supreme exponent of fugue writing for organ or clavier. See Art of Fugue.

**Führer** (Ger. leader). Title taken by Adolf Hitler, and as applied to him almost a sacred word to Nazis in Germany; just as the familiar Prophet has become sacred to the Mahomedans when applied to Mahomet. Benito Mussolini, as Il Duce, and General Franco, as El Caudillo, Marshal Antonescu as Conducator, assumed similar titles in Italy, Spain and Rumania respectively.

**Fujiyama, FUSIYAMA, or FUJISAN.** Loftiest peak in Japan, on the island of Honshu. Alt. 12,390 ft. A dormant volcano, with a beautiful snow-capped cone, it occupies a position of splendid isolation, 60 m. S.W. of Tokyo. According to tradition it was upheaved during one night in 285 B.C. and at the same time a depression was caused near Kyoto, which is now occupied by Lake Biwa (*q.v.*). Its crater, nearly 3 m. in circumference and 500 ft. deep, is now filled with water.

The last recorded eruption happened in 1707-08. The sacred mountain of Japan, it is annually visited by thousands of Buddhist pilgrims, who ascend to the summit to pray at the numerous

Fugue







Fujiyama. The famous snow-capped mountain of Japan viewed from Omiya village

shrines. It is frequently portrayed on Japanese pottery, and is a favourite theme with poets and artists.

**Fukien.** South-eastern coastal province of China. It contains 64 counties and two municipalities, with Foochow (Minhou) as its capital. Other important cities are Mamoi, at the mouth of the Min, an important naval training base; the port of Amoy, Yungan, and Kienou. There is only one short rly. in the province, but five highways link it with other parts of the country. The principal products are rice, tea, tropical and candied fruits, fish, and lacquerware. Area 45,845 sq. m. Pop. (1953) 13,142,721.

Japanese forces invaded Fukien in April, 1941, during the China-Japan conflict, Foochow being occupied on April 21. By this Japanese success the Chungking government lost one of its last lines of communication by sea; but Chinese troops compelled the Japanese to evacuate the port on Sept. 3. The prov. was again invaded on June 18, 1942, from Kiangsi; and in Sept. the coastline opposite Formosa was "scorched" as a precaution against invasion from that direction. On Oct. 8, 1944, Japanese units recaptured Foochow, this success giving them possession of all important harbours on the S. coast of China. The Chinese regained the port May 18, 1945.

**Fukui.** Town of Japan, on the island of Honshu. Seat of the prefecture of Fukui, it stands athwart the Ashiwa, 80 m. N.N.E. of Kyoto. It had silk and paper industries. Heavily damaged in U.S. air raids during the Second Great War, it was being rebuilt when an earthquake, June 28, 1948, destroyed almost every house and killed more than 1,000 people.

**Fukuoka.** City of Japan, on the island of Kyushu. It stands at the

head of a small stream on the N. coast, 86 m. by rly. N.N.E. of Nagasaki. A suburb, Hakata, is on the opposite shore of the stream. There are several good streets, a citadel, and a public garden. It is noted for its silk industry. The town is the seat of the prefecture of Fukuoka. Pop. (1950) city, 392,649. Several other towns of Japan bear the same name.

**Fukushima.** Town of Japan, on the island of Honshu. It is 170 m. by rly. N.N.E. of Tokyo. Its principal trade is connected with silk and silkworm cocoons, which are exported in large quantities. Pop. (est.) 50,000.

**Fukushima, BARON** (1853-1919). Japanese soldier. Entering the army as a drummer-boy, he studied at Tokyo University, and joined the general staff in 1875. Attaché at Peking, 1882-84, he was transferred to Berlin, 1887-92. In 1892-93 he accomplished a 9,000-mile horseback ride from Berlin to Vladivostok by way of Russia and Siberia. He was sent on missions to Egypt, Turkey, Persia, Caucasus, Arabia, India, Burma, and Siam. General staff officer in the Manchurian army during the Russo-Japanese war, 1904-05, he became chief of staff, 1906. Made governor-general of Kwantung, Manchuria, he died Feb. 18, 1919.

**Fukuyama.** Seaport of Japan on the island of Hokkaido. It stands at the S.W. extremity of the island, 53 m. S.W. of Hakodate. Formerly it was the chief seaport of Hokkaido, but it has lost much of its commerce to Hakodate. There are numerous temples and shrines, and the town was once the chief residence of the lords of Matsumai. Pop. (est.) 58,000. There is another Fukuyama on the S. coast of Honshu.

**Fula** (Mandingan, red-dish). Widespread African people in the western Sudan, the plural being Fulbe and the Hausa name Fulani. Estimated at 8,000,000, and descended from

an early admixture of Libyan—not pre-Libyan—and Negro stocks, they are handsome, chestnut-hued, straight-nosed, thin-lipped, and curly-haired.

In the 7th century A.D. the Fulbe were still in the uplands south of Morocco; by the 13th they were cattle-owning nomads, partly Islamised, in Bornu; by the 16th they had reached Lake Chad, and, after founding the Sokoto kingdom (1807-1903), they became a virile people dwelling from the Atlantic coast to the Nile valley; there is much admixture of Hausa blood among them.

They are compact in Futa Jallon, dominant in Sokoto and Gando, where many have adopted settled husbandry, and colonist in Bornu, Bagirmi, and Wadai. The ruling Mahomedan aristocracies are aggressive and intelligent, with many mosques and schools. The cow-Fulani or Bororoje are peaceable booth-dwelling nomads. The most easterly tribes are hostile to Islam.

**Fulcrum** (Lat. *fulcrum*, a prop). Fixed point in the mechanical system of a lever about which the lever can rotate. *See* Lever.

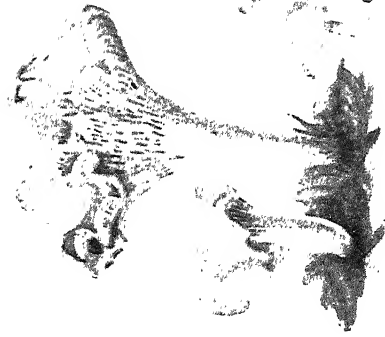
**Fulda.** City of W. Germany, in the *Land* of Hesse. It stands on the Fulda, 69 m. N.E. of Frankfurt-on-Main. The chief ecclesiastical building is the cathedral, an 18th-century edifice modelled on S. Peter's at Rome, with the crypt of a church of 751 containing the tomb of S. Boniface. The church of S. Michael dates from c. 820, and that of S. Severus from the 15th century. Secular buildings include the castle, the town hall, and the library, with a large and valuable collection of books and MSS. There are two squares and a public park. Industrial works include textile factories and rly. shops; there is a trade in cattle and agricultural produce. The U.S. 3rd army occupied it on April 4, 1945, in the Second Great War, and it was in the U.S. zone of occupation after the Allied conquest of Germany.

Fulda is noted for its abbey, round which the town grew. This was founded by S. Boniface in 744, and was endowed with authority over Benedictine houses in Germany and France. It was very rich; its abbot became one of the great prince-bishops ruling a territory of some size. This was secularised in 1803, and, after belonging to various princes, was divided between Hesse-Cassel and Bavaria. Most of it later became Prussian. There was a university here during 1734-1803. Pop. (est.) 30,000.



Fula woman from Timbuktu





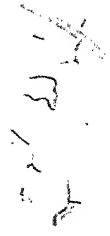
Chanterelle  
(*Cantharellus cibarius*)



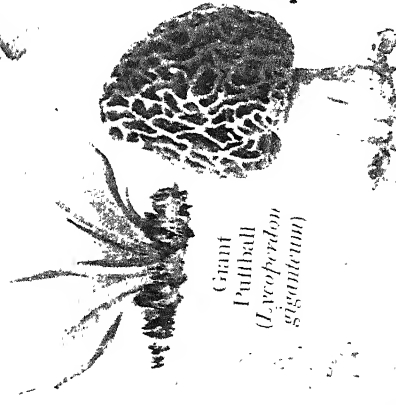
Common  
Mushroom  
(*Psalliota  
campestris*)



Fairy Ring Mushroom  
(*Marasmius arcuatus*)



Giant  
Puffball  
(*Lycoperdon  
giganteum*)



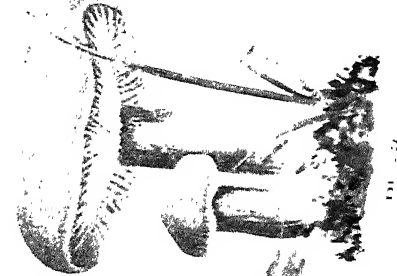
Common Morel  
(*Morchella esculenta*)



Edible Boletus  
(*Boletus edulis*)



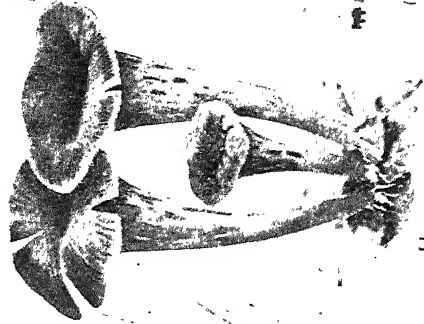
Warty Caps  
(*Amanita rubescens*)



Sluggo Caps  
(*Coprinus comatus*)



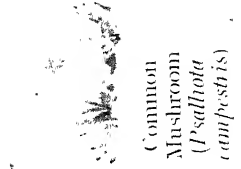
Sheathed Amanita  
(*Amanitopsis fulva*)



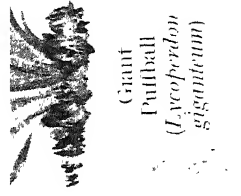
Horn of Plenty



Chanterelle  
(*Cantharellus cibarius*)



Common  
Mushroom  
(*Psalliota  
campestris*)



Giant  
Puffball  
(*Lycoperdon  
giganteum*)



Edible Boletus  
(*Boletus edulis*)

Fairy Ring Mushroom  
(*Marasmius arcuatus*)



Common Morel  
(*Morella esculenta*)



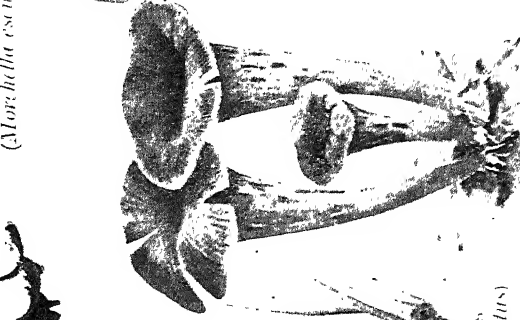
Warty Cap  
(*Amanita rubescens*)



Blewits  
(*Tricholoma personatum*)



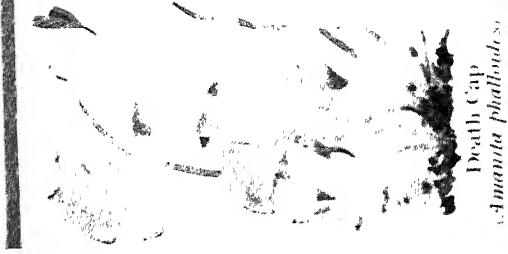
Slaggy Caps  
(*Capitatus comatus*)



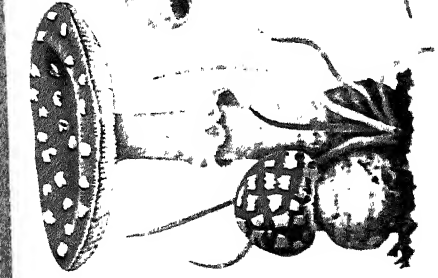
Horn of Plenty  
(*Craterellus cornucopioides*)



Sheathed Agaric  
(*Trematolops fulva*)



Death Cap  
(*Amanita phalloides*)



Fly Agaric  
(*Amanita muscaria*)



Verdigris Agaric  
(*Stropharia arcuata*)



Purple Agaric  
(*Cortinarius  
porphyrocephalus*)



Yellow Stringed Mushroom  
(*Psalliota vitellina*)

The great majority of the many hundreds of species of fungi found in Great Britain are harmless, though even these should not be eaten without full examination and identification. Poisonous kinds are shown above between the red lines. These pictures, which show the examples about half actual size and in correct colouring, are reproduced by courtesy of H.M.S.O. from Bulletin No. 23 of the Ministry of Agriculture and Fisheries

# FUNGUS : SOME BRITISH SPECIES, EDIBLE AND POISONOUS



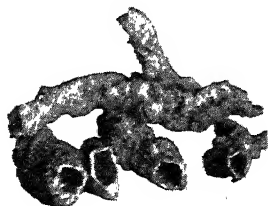
**Fulda, Ludwig** (1862-1899). German poet and dramatist. Born at Frankfort-on-Main, July 15,



Ludwig Fulda,  
German dramatist

1892. By winning a contest with his first comedy, *Die Anfrichtigsten*, 1882, he became popular; his early play *Der Talsmann*, 1892, was awarded the Schiller prize, but William II vetoed the grant. Among his comedies, *Jugendfreunde*, 1897, and *Die Zwillingsschwester*, 1900, the fairy drama *Schlaraffenland*, 1901, and *Maskerade*, 1904, stand out. His gift of rhyme served Fulda for translations of Shakespeare's sonnets, Molière's and Beaumarchais's plays, Rostand's *Cyrano de Bergerac*, and Ibsen's *Peer Gynt*. He was a holder of the Goethe medal and from 1928 a president of the German academy of poetry.

**Fulgurites** (Lat. *fulgur*, lightning). Tubes formed in sandy soil, and less commonly in rocks, by



Fulgurite. Specimens obtained  
at Maldonado, Uruguay

passage of lightning. This often penetrates to a depth of many feet, fusing the particles it encounters. The glassy lining often produced in tubes varies in size to more than two ins. in circumference. Fulgurites are common on Mt. Ararat, in the Alps, Pyrenees, and in Mexico and La Plata.

**Fulham.** Metropolitan bor. and parish of the co. of London. On the Middlesex side of the Thames, S.E. of Hammersmith, it has been a parish since 1631 and a met. bor. since 1899. Its oldest building is Fulham Palace, the ancient manor house of the bishops of London, the courtyard of which belongs to the time of Henry VII. During the bishopric of Frederick Temple a part of the grounds now called Bishop's Park was opened to the public. The parish church of All Saints, a Perpendicular structure, rebuilt 1880-81, near Putney Bridge, has a 14th century tower, an organ by Jordan, 1700, a fine peal of bells.

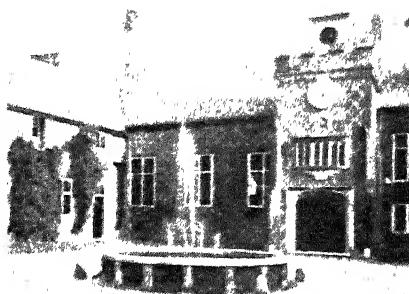
Well served by buses and underground rails. Fulham has a town hall, public library, an old pottery, and consists of the grounds of the Chelsea and Fulham football clubs, and of the Hurlingham sports club; also Queen's Club. Enamelled names associated with the district, which includes Parnes's Green and Waltham Green, are those of Addison, Bartolozzi, Burbage and Gendoll, Sir T. Bodley, John Florio, Burne-Jones, Lord Lytton, Samuel Richardson. Fulham gives its name to a bor. constituency. It was heavily bombed in the Second Great War, over 22,000 houses suffering damage. Pop. (1951) 122,651.

**Fulham Ware.** Fine stoneware first produced in 1671 by John Dwight (*q.v.*) at Fulham. It was an imitation of china, semi-transparent, with hard, close body of grey colour. Jugs, pots, bottles, butter dishes, and busts were produced. The enamel was brilliant, the colours being largely blue and purple. The decorations of flowers and leaves were raised. Marbled pieces were also produced.

Dwight gave up in 1746, and was succeeded by White until 1762. The factory is still carried on, stoneware jugs and pots being produced. In 1888 William De Morgan began the manufacture of quaintly shaped pots and pans in lustre ware.

**Full Age.** A person reaches full age in the U.K. when he or she completes 21 years of age, which is deemed to happen at the first moment of the day preceding the 21st anniversary of birth. This is because the law does not regard fractions of a day. The sovereign attains full age at 18.

**Fuller.** Person whose occupation is to full cloth, or carry out a finishing process by which cloth is thickened and shrunk. The term is also applied to a tool used by



Fulham Courtyard of Fulham Palace, built in the time of Henry VII

blacksmiths for shaping iron by forcing it into grooves.

**Fuller, John Frederick Charles** (b. 1878). A British soldier and publicist. He was born Sept. 1, 1878, and commissioned in the Oxford and Bucks Light Infantry, serving in the South African and First Great Wars. As chief general staff officer of the tank corps in 1917 he took a prominent part in the attack at Cambrai. He was the inventor of the Fuller-phone (*q.v.*). Fuller was chief instructor at the staff college in 1922 and military assistant to the C.I.G.S. in 1926. Promoted major in 1930, he was placed on retired pay in 1933. His published works include *Tanks in the Great War 1914-18*, 1920; *The Foundations of the Science of War*, 1926; *Grant and Lee*, 1933; *Armament and History*, 1945; *Decisive Battles of the Western World*, 3 vols., rev. ed. 1954-56.

**Fuller, Thomas** (1608-61). An English divine and historian. Born at Aldwinkle St. Peters, Northants, and educated at Cambridge, he shared the reverses of the Royalists during the Civil War. In addition to private chaplaincies and lectureships, he held at various times the curacy of St. Bene't's, Cambridge, the rectory of Broadwindsor, Dorset, the curacy of Waltham Abbey, and the rectory of Cranford, Middlesex; but from 1642 till his death depended largely upon his pen for subsistence, with such books as *Good Thoughts in Bad Times*, 1645.

Fuller was the first to follow Bede in attempting to write the ecclesiastical history of England, his *Church History of Britain* being published in



Thomas Fuller,  
English divine

Fulham Ware. Figure  
of Jupiter by John  
Dwight  
Liverpool Museum



1655. His History of the Worthies of England was issued in folio in 1662. Witty and learned, he was happily described by A. Jes-sopp, who in 1892 published a selection from his writings, as the Sydney Smith of the 17th century. He died Aug. 16, 1661.

**Fullerphone.** Telegraph system invented by Major-Gen. Fuller (q.v.) for use by the British army. The alternating components of the buzzer currents are used for hearing signals in a telephone receiver while the direct current impulses are filtered and used for the line. The system cannot be tapped and provides for compensating the effects of steady, stray earth currents. See Telephone.

**Fuller's Earth.** A natural clay used as an adsorbent of oil and grease during the fulling of cloth. It is a hydrated aluminium silicate with proportions of other bases. Many clays possess this property to a slight extent but it is shown to a marked degree only by those which are largely minerals of the montmorillonite-beidellite groups. Fuller's earth is worked on a large scale in England, the U.S.A., and Germany. In England it is now found only near Redhill, Nutfield (Sussex), Bedford, and Bath, the active mineral being calcium montmorillonite. Some of the world's best supply comes from Florida. It is used for refining animal, vegetable, and mineral oils, for the preparation of foundry sands; as a filler in many industries; for pharmaceutical purposes; for preparation of cosmetics; as a carrier for basic dyes; but very little is now used for fulling.

A subdivision of the Jurassic system of strata in England is named the Fuller's Earth formation. It outcrops from the Dorset coast to Gloucestershire. The only occurrence in this formation of fuller's earth, is that near Bath.

**Fulling.** A process of cloth finishing, characteristic of woollen cloth as distinct from worsted, also known as milling. The cloth is stitched end to end to form an endless belt, and passes upwards from a warm soap or dilute acid liquor through a funnel-like device which squeezes and rubs it, and then between squeeze-rolls back into the liquor. This cycle continues until the desired effect is obtained. In Meltons, uniform cloths, etc., the weave becomes entirely obliterated and the fabric shrinks to half its original width. Yorkshire practice is to full quickly, whereas West of England

hannels are full'd over several days. Fulling gives a smooth felt-like appearance and makes cloth more impervious to wind and weather. It is based on the propensity of wool fibres for interlocking under the action of rubbing while wet.

**Full Score.** Extended score of a musical composition showing the parts for various voices and instruments on separate staves, for a conductor's guidance or a student's information. Many different arrangements have been used, but the following is the plan of a typical modern score. The names in roman type show the instruments of the classic orchestra, those in italics are the modern additions or more rarely used instruments.

WOODWIND.—*Piccato*, Flute, Hautboy (oboe), Clarinet, Bassoon, *Double Bassoon*.

BRASS.—Horn, Trumpet, Cornet, Trombone, *Bass Tuba*.

PERCUSSION.—Kettle Drum, *Side Drum*, Triangle, *Bass Drum*, Cymbals.

STRINGS.—*Harp*, Violin I, Violin II, Viola (Voices, if any, on separate staves) Violoncello, Double Bass, Organ.

**Fulmar.** Two-seater fighter reconnaissance aeroplane of the Royal Navy. It was powered by a single 1,145 h.p. Rolls-Royce Merlin engine, and had a maximum speed of 250 m.p.h. Wing span was 46 ft., length 40 ft. 5 ins. Introduced in 1940, it was later replaced by the Firefly and other more modern carrier-borne aircraft. See illus. pp. 130-131.

**Fulmar Petrel** (*Fulmarus glacialis*). Sea bird common in the Hebrides and St. Kilda. These pet-



Fulmar Petrel. A native of the Hebrides and north coast of Scotland

rels are usually grey on the back and white below, and measure nearly 20 ins. in length. They commonly follow whaling ships to feed on the refuse blubber, and nest on grassy slopes among the cliffs.

**Fulminate of Mercury** (Lat. *fulminare*, to lighten, thunder). Sensitive and violently explosive compound used for the initiation of high explosives. Discovered by Howard in 1799, it has the composition  $\text{HgC}_2\text{N}_2\text{O}_2$ . Owing to its

sensitive nature little was done with it for some years, but by 1815 it was utilised for percussion caps.

It is manufactured by dissolving mercury in strong nitric acid and adding this whilst warm to a large quantity of ethyl alcohol in a glass flask, from which the fumes pass to condensers. Shortly after the ingredients have been mixed reaction commences, and if it should be too violent is modified by the addition of more alcohol. About half an hour after the start, fulminate is deposited from the solution as fine crystals, and when all reaction is over the liquid is decanted off and the product washed free from acid, and stored under water until required for use. Occasionally fulminate is stored in a moist condition, but never dry, as it is decidedly less sensitive when it contains at least 12 p.c. of water.

Fulminate of mercury is a fine crystalline powder, white to grey-brown in colour, and has a density of 4.42. It has a sweetish metallic taste and is highly poisonous. It is detonated by moderate friction or percussion, by heating to about  $150^\circ\text{C}$ . or by contact with strong sulphuric acid. If unconfined, small quantities burn violently when ignited, but two sheets of paper confine it sufficiently to cause violent detonation. Its most remarkable and useful property is its ability to cause the detonation of other explosives, and it is widely used in detonators and caps.

**Fulminic Acid.** Dibasic acid which has not been obtained in the free state. It was prepared combined with mercury, as fulminating mercury, by Howard in 1800, and Liebig, in 1822, showed that the mercury is combined with a peculiar acid which he named fulminic acid.

**Fulnek.** A town of Moravia, Czecho-Slovakia. It is 17 m. S. of Troppau. It has a cathedral church of considerable architectural merit and a Capuchin convent. It was for many years the centre of the Moravian Brotherhood (q.v.), and in this connexion gave its name to Fulneck, their settlement in the W. Riding of Yorkshire, England.

**Fulton, ROBERT** (1765-1815). American engineer. Born in Pennsylvania and poorly educated, he showed talent as a painter, and crossed to London, where he studied under Benjamin West. Abandoning art for engineering, in 1794 he invented improvements for the canal systems, and two years later went to Paris, where he turned his attention to the adaptation of the steam engine for marine purposes.

An experiment in 1803 answered all his hopes, and in 1807 he constructed a larger vessel, the *Clement*.



Robert Fulton,  
American engineer  
after Benjamin West

in New York, whither he had returned the previous year. This was followed by the steam frigate *Fulton* in 1814. Enough not the inventor of marine engines. *Fulton* was the first to apply steam successfully to navigation. He died Feb. 14, 1815.

**Fulvia.** Mistress of Curius, one of the ringleaders in the conspiracy of Catiline against the Roman republic in 63 B.C. It was she who divulged the plot to the consul Cicero. She is not to be confused with the *Fulvia* the wife, first of Clodius, and later of Antony.

**Fumariaceae** (Lat. *fumes*, smoke). Family of annual or perennial herbs. They are natives of temperate and warm regions of the N. hemisphere; also of S. Africa. They have tender divided leaves and small irregular flowers in sprays; the four petals forming two unequal pairs. The watery juice is acrid. See *Fumitory*.

**Fumaric Acid.** Solid dibasic acid somewhat widely distributed throughout the vegetable kingdom, notably in fumitory (*Fumaria officinalis*), Iceland moss (*Lichen islandicus*), and various fungi. It is best prepared by heating malic acid (p.a.) at 150° C. in a current of air so long as water distils over. The residue is washed with a little water and dried at 100° C. It forms normal and acid fumarates with the alkali metals.

**Fumarole** (Lat. *fumarolium*, smoke-hole). Vapour-vent in volcanic districts, which acts as a funnel for the escape of gas. Many are formed during eruption of such volcanoes as Vesuvius and Etna. They were first studied by R. W. Bunsen in Iceland. See *Volcano*.

**Fumed Oak.** Oak furniture timber darkened by fumes of ammonia to give an appearance of age.

**Fumigation** (Lat. *fumigare*, to smoke). Term used for the disinfecting of rooms, clothing, etc., by means of certain vapours. Sulphur was the popular substance for fumigation through many generations which burnt it in a form of candle. Its action is by the generation of sulphuric acid, but this is ineffective against micro-organisms and kills only some 50 p.c. of beetles and bugs, driving the rest

away to neighbouring quarters. Triphosphene vapour has superseded it, as have sprays of powdered D.D.T. Paraformaldehyde in 40 p.c. solution is now the method of choice of disinfection against contagious or infectious diseases; it is sprayed over the contents of the room, which is sealed and left for some hours. Regulations have been made for prevention of accidents due to fumigation with hydrogen cyanide.

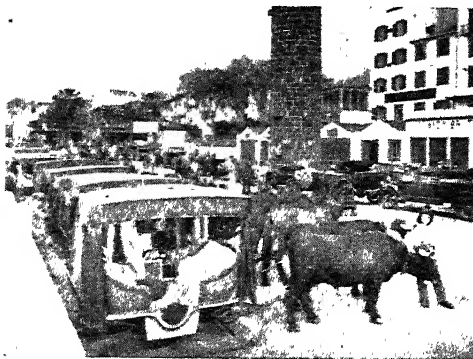
In gardening, fumigation is the process of destroying greenfly, red spider, and other greenhouse pests by means of smoke. The greenhouse is closed and a few leaves of tobacco are caused to smoulder for about an hour, when the plants must be removed and sprayed with rainwater before being replaced in the greenhouse, which has meantime been scrubbed down with carbolic soap. Various proprietary substances may replace tobacco.

**Fuming.** Property possessed by some liquids of emitting fumes on exposure to air. Fuming sulphuric acid, a solution of sulphur trioxide in sulphuric acid, gives off dense white fumes when air is admitted to the bottle containing the acid. Libavius's fuming liquor is solution of tin tetrachloride, whilst Boyle's fuming liquor contains ammonium polysulphides.

**Fumitory** (Lat. *fumus terrae*, earth-smoke). Small genus (*Fumaria*) of annual or perennial herbs of the family Fumariaceae. Natives of Europe and Asia, they hang on the borders of cultivation. The leaves are much divided into slen-

der segments, and the small flowers are in terminal sprays. Common fumitory (*F. officinalis*), the best known species, has delicate, much-divided, grey-green leaves and small rosy-purple flowers. The name is variously explained by its fancied resemblance to smoke curling upwards, its being engendered from a vapour rising from the earth, and the irritant effect of the plant's juice on the eyes.

**Funchal.** Capital of Madeira, an island in the Atlantic, belonging to Portugal. It stands on Funchal Bay, on the gentle ascent of some



Funchal. Quayside sled stand in Funchal, Madeira. The town being on a steep hillside rising from the sea to a height of 4,000 feet, many of the streets are too steep for wheeled vehicles

hills in the form of an amphitheatre, and as seen from the sea is very beautiful, with its houses of dazzling whiteness, embosomed among tropical verdure. The principal residents have their country houses on the encircling hills. Funchal has a salubrious climate, is well provided with water, and is a popular winter health resort. It has a cathedral, Anglican and Presbyterian churches, hospitals, museum, theatre, casino, meteorological observatory, wireless telegraphy station, cable communication with Lisbon, Falmouth, and Pernambuco. Pop. (1950) 37,215.

The streets, which are steep and narrow, are electrically lighted and have no wheeled traffic, oxsleds being used. There is a large trade in wine and coal. In the roadstead is a steep black rock crowned by a castle. Funchal was bombarded by German submarines on Dec. 3, 1916, and Dec. 12, 1917.

**Function** (Lat. *functio*). Term used in mathematics. One quantity is said to be a function of another when, for any particular value of one, there is a corresponding value or set of values of the other. This may be made clear by a simple example. If a train



Fumitory. Flowers and foliage of *Fumaria officinalis*

travels at 50 miles an hour, then the distance travelled is a function of the time, *i.e.* in six hours the distance travelled is  $6 \times 50$  miles, in 10 hours  $10 \times 50$  miles, and generally in  $n$  hours  $50n$  miles.

This is the simplest example of a function, but there occur many complicated functions in mathematics, and the expression relating one with another, or the function with its argument, as it is called, is generally given in the form  $y=f(x)$ , or  $w=f(x, y, z)$ , and so on.

The term function is due to Leibniz, who in 1692 divided functions into algebraic and transcendental, the former being those functions which may be expressed by elementary algebraic operations, the latter the remainder. *See* Algebra; Mathematics.

**Functional Disorders.** Pathological conditions in which the functions of muscles, limbs, or organs are disturbed without any apparent organic basis, *i.e.* no change can be detected in the anatomical structure of the muscles or nerves affected. Some change of structure must exist, however, to alter activity. *See* Hysteria; Neurasthenia.

**Functionalism.** Term applied to utilitarian forms of contemporary architecture and design. The functionalist attitude implies returning to first principles, and in using materials such as reinforced concrete, glass, and steel to bring about a radical change in the popular attitude to architecture as established in the 19th century. After the First Great War architectural development was greatly influenced by engineering and machine design, the frame construction of buildings tending to eliminate all unnecessary detail and ornament. Functionalism accepts such elimination as an aesthetic principle, relying on beauty of line to express dynamic simplicity. Thus it stresses the utilitarian aspect of buildings, furniture, and other utilitarian objects. Le Corbusier (*q.v.*) drew attention to the beauty of machinery in *Towards a New Architecture*, and influenced a whole school of architects and designers, who aimed at coordination of construction with and the expression of a single purpose. *See* Aesthetics; Architecture, Modern.

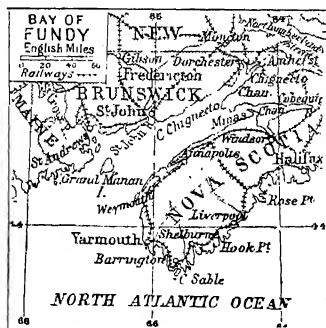
**Fundamentalism.** Belief held by those who are convinced of the literal and complete accuracy of the Bible. Fundamentalists are strongly opposed both to the higher criticism and to Darwin's teaching that man is the product

of an age-long process of evolution. Fundamentalism remains particularly strong in the U.S.A. *See* Monkey Trial.

**Funded Debt.** Debt, particularly in national finances, which is of a permanent or semi-permanent nature, as distinct from short-term or floating debt. Of the various forms of government debt in Great Britain,  $2\frac{1}{2}$  p.c. consols,  $3\frac{1}{2}$  p.c. conversion loan, 4 p.c. consolidated loan, and  $3\frac{1}{2}$  p.c. war loan constitute the principal items in the funded debt.

**Funds** (Lat. *fundus*, bottom). Word meaning a sum of money or supply of credit. A fund is a sum set apart for some special purpose, *e.g.* an endowment fund or a building fund. In the plural the word has the special meaning of government securities, consols, etc. A fundholder is one who possesses such, and to fund part of the national debt is to turn it from a temporary into a permanent security, *i.e.* to turn treasury bills into consols or war loan, which is then known as the funded debt. *See* National Debt.

**Fundy, BAY OF.** Extension of the N. Atlantic Ocean, dividing Nova Scotia from New Brunswick,



Bay of Fundy. Map of inlet of the Atlantic between New Brunswick and Nova Scotia

Canada. It terminates in two branches, the N. section being known as Chignecto Channel or Bay, and the S. as Minas Channel, which leads to Cobequid Bay. From Grand Manan Island, which stands at the entrance of the bay, to Cape Chignecto, its length is about 100 m., and its mean breadth 35 m. Several rivers drain into the bay, the chief are the St. John and the St. Croix.

Except for the fogs which drift into the bay in summer from the Gulf Stream, the bay is easily navigable, the coasts are rocky, and the ceaseless tidal scour prevents the accumulation of sandbanks; the tides themselves are

swift but regular. Spring tides are high; they range from 27 ft. at St. John to 50 ft. in Minas Channel; wherever a river estuary is narrow the tide makes a bore, usually from 4 ft. to 6 ft. high.

**Fünen.** Island forming part of Denmark, is also known as Fyen and so described in this work.

**Funeral** (low Lat. *funeralia*, things belonging to a funeral). Comprehensive term, at one time written in the plural, for the ceremonies, etc., attending the conveyance of a dead person to grave or tomb. The term obsequies, often used in the same connexion, has not quite the same meaning: funeral means a mournful ceremony, especially the processional part of it; obsequies, a respectful valediction. The National Association of Funeral Directors, 11 Soho Sq., London, W.1, exists to organize funeral carriage proprietors and improve the ordering of funerals, and to provide for the holding of examinations, and awarding of diplomas in the proper conduct of the business. *See* Burial Customs.

**Funeral Rites.** Ceremonial observances attending the actual disposal of the dead. The time intervening between death and the funeral rite may be a few hours, several months, or—as with eminent Burmese monks—more than a year. Interment often occurs at night, as in ancient Greece and Rome, to avoid polluting the sunlight, or at sunset, to prevent the ghost from capturing living shadows. Basuto graves, dug after dark, are filled in before dawn awakens the children. Salutation of the corpse occurs in E. Europe; in Hungary, kissing of the right hand accompanies appeals for forgiveness. In the U.K. the dead are sometimes touched to prevent future haunting.

The place of sepulture may be indicated by omen; the Laos carry the dead into the jungle, and halt when sensible of increased weight. Bodies may be carried through smoke-holes or apertures in the house walls. Carrying out feet foremost ranges from Torres Strait to modern Europe. Chams turn the bier about and bear it along zigzag paths to circumvent the ghost and impede its return. Borneo Iban obliterate the bearers' footprints; in the Congo basin thorns are strewn after the procession. Crossing water is symbolised among the Koryak by lines across the path, leaped over by returning mourners. Attendants in Arctic lands pace thrice

round the body, and in the Hebrides thrice round the church, to protect the living.

The last pilgrimage is facilitated by various observances. The face may be turned towards sunrise, sunset, Mecca, or the tribal cradleland. Coins are provided for the ferryman, honey-cakes for Cerberus, passports for the janitor. Immolation of relatives and slave-sacrifice, formerly rife in some barbaric societies, and still extant, survives symbolically in the paper effigies of attendants burned at Chinese graves. Many tribes in S.E. Asia offer funeral honours to symbolic images, a practice observed also in Brittany and Italy.

#### Precautions Against Pollution

Measures are taken to avoid pollution, as when Yakut inter the mortuary shovels, or Warundi the earth baskets. Baganda mourners cleanse their hands with plantain leaves; some Australian aborigines fumigate themselves; Fanti mourners wash in the sea. The Semitic use of burned spices passed into early Christian ritual. Fear of the ghost's return, which dictates the Eskimo custom of waving torches behind the corpse, accounts in part for the medieval use of bells and candles. Corpses may be mutilated, or fires maintained on graves. In some instances ghosts are deemed to haunt their former homes until flesh decays. The bones are then disinterred for a final funeral rite.

Earliest evidence for the widespread funeral feast comes from Neolithic Europe. The Gilbert Islands feast during three days preceding the funeral is comparable with the Irish wake. Feasting continues for several months in Madagascar, and for a year in Patagonia. Primitive cannibalism is perpetuated in the Cocoma practice of mixing pulverised bones in ritual cups, and symbolically in corpse-cakes, arval bread, and other special viands provided at ritual meals. These, sometimes indicating communion, are largely displaced by food and money dols. Dances, designed as magical rites to placate or scare the ghost, or to stamp down the grave, are associated with public spectacles, as in ancient Greece and Rome, or with games, such as the blind-man's-buff formerly played in S. Ireland, or the Sioux dicing for the effects of the deceased. See Burial; Mourning Customs.

**Fung-hwang.** Fabled bird of Chinese mythology. Generally described as a kind of phoenix, a fantastic representation of it is

frequently found in the decorations of Chinese embroideries and porcelain. The word is sometimes rendered Fum, and is thus given in Thomas Moore's satiric verses, Fum and Hum.

**Fungicide.** Substance used to safeguard plants against attack by fungus. Fungi, belonging to the lowest group of the plant kingdom, do not contain the green colouring matter chlorophyll, which enables the green plant to assimilate the carbon dioxide of the air and build up the carbohydrates necessary for plant growth. They are parasitic organisms deriving their food directly from the host plants. As the fungal threads develop rapidly within the body of the plant, remedial measures cannot be applied at the seat of infection. Either the spores of the fungus must be killed with a direct or eradicant fungicide, or, more effectively, conditions must be created which are unfavourable for the germination of spores. This is done by applying a protective fungicide. Certain disease-spreading organisms (bunt in wheat, smut and stripe in barley and oats) are seed-borne, i.e. they infect the seed of the host plant before germination. Fungicides for the treatment of such diseases are called seed dressings or seed disinfectants.

Fungicides should be toxic to the fungus at relatively low concentrations and should retain their activity on the spray-coated surface for a considerable time. They are applied as dusts or sprays (see Insecticide) and should be renewed as rain removes the protective film or new growth occurs.

#### Copper Fungicides

The main groups are based on copper, sulphur, and mercury. Copper fungicides consist, in general, of water-insoluble copper compounds which, when applied, liberate traces of soluble copper. The most familiar is Bordeaux Mixture, a suspension of basic copper sulphate, prepared by the interaction of copper sulphate (4 oz.) and hydrated lime (5 oz.) in 2½ gallons of water. It is effective against potato blight, leaf spot of celery, leaf curl of peach, and downy mildew of vine. A related but less safe fungicide is Burgundy Mixture, prepared from copper sulphate and washing soda. Among the dusts are Bordeaux powders and copper-lime dusts. Copper oxychloride and cuprous oxide are also used. The chief sulphur fungicides are elementary sulphur (as dust or in wettable, dispersible, or colloidal form) and lime sulphur

(the deep red solution of calcium polysulphide, used for apple scab control). Seed dressings consist of organo-mercury derivatives.

**Fungine.** See under Chitin.

**Fungus.** Enormous group of cellular cryptogams. There are four classes, *Phycomycetes*, *Ascomycetes*, *Basidiomycetes*, and *Fungi Imperfecti*. Some 37,000 species are all characterised by a total absence of chlorophyll, the green colouring matter contained in other plants. Thus they are unable to manufacture food from the carbon dioxide of the air and the mineral salts in the soil, and must obtain supplies from decaying or living vegetable or animal matter. Those that take it from living tissues are known as parasites and are responsible for many diseases; those obtaining it from the dead residues of plants and animals are called saprophytes; such is *Penicillium* (q.v.).

The vegetable body of a fungus is a *mycelium* of microscopic, thin-walled, branching threads or *hyphae*. Reproduction is by sexual or asexual spores. The forms of fungi are multitudinous, varying from the hard or corky brackets that advertise their attacks on trees, through the mushrooms, toadstools, and puff-balls of the woods and fields, to the minute and destructive leaf-moulds, rusts, and mildews that live on crops.

**FUNGICID PESTS.** Unless remedial measures are practised, the losses due to parasitic fungi may be enormous. In 1845 a hitherto unrecorded disease attacked the potato; it spread with alarming rapidity and next year destroyed practically the whole Irish potato crop, thousands of the peasantry dying of starvation. Potato blight is due to the minute fungus, *Phytophthora infestans*. In some countries the rust diseases of cereals cause great loss. Black rust of wheat, due to *Puccinia graminis*, decreased the Canadian wheat crop in 1916 by 100,000,000 bushels.

Of preventive measures, by far the most effective is good farming that aims at producing healthy, vigorous crops. The correct choice of variety, clean seed free from disease and weed, and a well-planned sequence of cropping will do much to prevent crop failures, but will be of no avail if the soil is sour or badly drained. Weeds often harbour destructive fungi and insect pests, and special attention should be given to headlands, hedges, and ditches. The danger of infection is much increased by growing a crop continuously on the same piece of land.

Fungi may be present on the seed, in the soil, or in the air, but are so minute that they can be seen only with a microscope. When spores are present on the surface of the seed, the diseases to which they give rise can usually be prevented by treatment with an appropriate fungicide (*q.v.*), examples of seed-borne diseases are covered smut or bunt of wheat (*Tilletia caries*), covered smut of barley (*Ustilago hordei*) and the oat smuts. As their spores are present on the grain they can be killed by disinfecting the seed before it is sown with powders known as organo-mercury seed dressings. With loose smut of wheat (*Ustilago tritici*) and loose smut of barley (*Ustilago nuda*) the agents of disease are deeply embedded within the grain and beyond the reach of the fungicide. These diseases are not of serious consequence in Great Britain.

#### Starve the Fungus in the Soil

Diseases caused by soil-inhabiting fungi are more difficult to control, but usually they can be avoided by a sound sequence of cropping. The remedy is to starve the fungus from the soil by avoiding susceptible crops. If red clover and related crops are grown too frequently, the land may breed clover rot (*Sclerotinia trifoliorum*). *Helicobasidium purpureum* causes the violet root rot disease of man-golds, sugar beet, carrots, etc.; this likewise must be starved from the soil. Many diseases are brought about by airborne spores and, to protect the foliage, crops are sometimes sprayed with fungicides. It is sometimes possible to avoid disease by growing resistant varieties, e.g. wheat resistant to yellow rust (*Puccinia glumarum*) and to black rust (*Puccinia graminis*).

**POISONING BY FUNGI.** The rarity of fungus poisoning renders it all the more dangerous when it does occur because of lack of knowledge on the part of those in attendance. Of the 2,000 larger fungi growing in England and in similar climates, 200 are edible, about 10 are poisonous, the rest are merely indigestible. Many brilliantly coloured fungi are edible, but because they do not resemble the ordinary mushroom they are not generally eaten. The extremely poisonous death-cap (*Amanita phalloides*) is easily mistaken for the edible mushroom (*Psalliota campestris*). Allied species are the fool's mushroom (*Amanita verna*) and the destroying angel (*Amanita virosa*), with white caps, fortunately rare in England.

The edible mushroom has a white cap with brownish-purple gills. The base of the stem is clubbed with no volva (height  $3\frac{1}{2}$  ins., width of cap 5 ins., width of stem 1 in.). The death-cap has a yellowish-green cap, white gills and volva at base of stem (height  $4\frac{1}{2}$  ins., width of cap  $3\frac{1}{2}$  ins., width of stem  $\frac{3}{4}$  in.). Fly agaric (*Amanita muscaria*) has a red cap with white patches (height 10 ins., width of cap 7 ins., width of stem 1 in.). Owing to its striking appearance it is not eaten in error, nor does it cause death.

Most current statements regarding edibility are valueless. The edible mushroom peels easily, but so does the death-cap. Rabbits can eat the latter with impunity, but man cannot. Change of colour on cutting has no implication; failure to blacken a silver spoon during cooking does not mean that the fungus is wholesome. Cases of poisoning by fungi may be considered as those with early symptoms or those with late. The early symptoms are diarrhoea and vomiting, while nervous symptoms may be present. Delayed symptoms come on eight hours or more after eating the fungus—vomiting and diarrhoea with intense abdominal pain—and this delay is characteristic of death-cap poisoning. Death often occurs from failure of liver function. If symptoms appear quickly, then, death-cap poisoning is unlikely; if 8 hours later, highly likely. The stomach

should be washed out, the bowel emptied by an enema, and atropine 1/50 grain (the adult dose) given intravenously. Insulin, glucose, and vitamin B all tend to support the liver. The administration of anti-phallic serum is a method of treatment, as is the diet of rabbit stomachs and brains.

**FUNK, WALTHER** (b. 1890). German journalist and economist. Born Aug. 18, 1890, in East Prussia, he was educated at Berlin and Leipzig universities, and became city editor of a Berlin financial paper. An early member of the Nazi party, he was economic adviser to Hitler from 1931, and chief of the Reich press bureau in 1933. Minister of trade and industry in 1938, he was appointed president of the Reichsbank the following year. Funk continued Schacht's policy of chaining Balkan countries by barter treaties to Hitler's war machine. Captured by Allied troops on May 14, 1945, he was indicted as a major war criminal, found guilty at Nuremberg, and on Oct. 1, 1946, sentenced to imprisonment for life. He was released in 1957 on the ground of ill health.

**Funny Bone.** Popular term for the groove between the olecranon process of the ulna and the internal condyle of the humerus on the inner side of the elbow. The ulnar nerve passes along this groove, and a blow on the nerve at this point produces the familiar sensation of "pins and needles." See Elbow; Humerus.

## FUR: ITS SOURCES AND TREATMENT

John C. Sachs, Fur Trade Expert

*This is a sketch of the history of the wearing of furs, and the way they are prepared for the market. See the articles on the various fur-bearing animals: Fox; Marten, etc.; also Costume*

Fur (old Fr. *forre*, sheath) may be defined as the skin of certain mammals which, after preparation, is worn by men and women for warmth. The Tabernacle of the Israelites had an outer covering of badgers' skins (Ex. 26, v. 14) and an inner one of rams' skins dyed red (Ex. 35, v. 7). The Chinese claim to have employed furs for 3,000 years, but their methods of preparing the skins have stood still for centuries, and the same remark applies to other Asiatic countries. The Assyrians, Greeks, and Romans all made lavish use of furs. The practice is mentioned by Herodotus, and Hercules, we are told, wore the skin of the Nemean lion.

The Romans learnt the ornamental use of furs from the Greeks, who owed their knowledge of them to campaigns against the Medes

and Persians. The legend of Jason and the Golden Fleece was probably the allegorical description of the voyage of a Greek fur trader who sailed into the Black Sea and collected large stocks of valuable furs from what are now southern Russia and Armenia. Skins were worn by the ancient Britons, Saxons, Danes, and Norsemen, but women made comparatively little use of furs until the Middle Ages.

#### Mark of Riches and Nobility

Many edicts have been promulgated forbidding the use of various fine furs by the commoners. The wearing of ermine early became a badge of nobility, and miniver, or ermine powdered with black spots, was regal wear, and to this day figures in the coronation robes of kings. Men wore heavily furred garments during the York and Lan-

caster period, and both sexes displayed furs freely in the time of the Tudor sovereigns. Henry VIII is portrayed almost swathed in furs.

Furs fell into disuse in England during the Stuart period, but a most important event with regard to the trade happened after the Restoration, when Prince Rupert founded a company to trade for furs in Hudson Bay, 1670. From this really dates the commencement of the British fur trade. It did not start under the happiest auspices; the first company was a failure: the wearing of furs was objected to by the Puritans as savouring of vanity, and the elegant dress of the cavalier, although eminently suitable for the display of ribbon, velvet, and lace, was not adaptable to the employment of the furriers' art. The chief fur markets of the world continued to be at Constantinople, as for over 1,000 years, at Nijni Novgorod, Venice, and Genoa, while smaller markets were held at Nuremberg and Leipzig.

The two great fur-producing countries of the world are Canada and Siberia. The colder the country the better the fur, hence the covering of the animals produced in the high latitudes of Canada and Russia is particularly thick and warm. From Canada or Siberia come the sable and American marten, mink, ermine, fisher, red and silver fox, lynx, wolf, beaver, musquash, otter, bear, squirrel, wolverine, elk, and musk ox; while within the Arctic circle are found the polar bear, white fox, seal, and hair seal. Skunk, raccoon, and opossum come largely from the U.S.A. Australia produces opossum, wallaby, and vast quantities of rabbit; the beautiful chinchilla comes from Peru and Argentina; and Armenia gives its name to the ermine, though its habitat is farther north. Astrakans, slinks, caracul, tigers, sheep, goats, and bears come from Central Asia.

#### Transport from Hudson Bay

The transfer of these skins from the wilds to the ultimate wearers necessitates an immense organization. The great fur companies have their main depots around Hudson Bay, which is closed to navigation by ice for over nine months every year; hence a vast amount of work has to be done during the short time that the bay is open. The *modus operandi* is briefly as follows. As soon as the ice breaks up the steamers make for the depots, and on arrival discharge their cargoes, food, clothing, rifles, ammunition, axes, etc. The empty holds are at once refilled with furs which have

been brought from the base posts to the depots to await the arrival of the ships or aircraft.

Smaller steamers convey the stores to the base posts, which in their turn make use of sailing barges or scows as a means of communication with the ordinary posts. These get in touch with the flying posts by canoe or sledge, and the flying posts are open at agreed times during the year, to receive visits from the trappers, obtain their catches, and furnish them with necessities.

European agents are located at base posts—where are collected provisions for the ordinary posts, as well as their accounts and their collections of skin—and these officials have under their orders rangers (practically extinct), half-breeds, Indians, and Eskimos. Indians obtain skins up to about 55° N. latitude—the far northern regions are worked by Eskimos.

#### The London Fur Market

London was, before 1939, the premier raw fur market of the world, but, owing to the Second Great War, this market was transferred to New York. The Hudson's Bay Co. auctions were resumed in 1946, with a view to re-establishing London as the centre of the world fur trade. The raw skins are consigned to London and sold at Garlick Hill sale rooms to a cosmopolitan crowd of buyers.

The following quantities, among many others, of skins were offered at the reopening of the London fur sales in 1946:

Beaver .. .. .	10,378
Ermine .. .. .	88,125
Fox: red .. .. .	24,886
Fox: white .. .. .	13,957
Lamb, Indian .. .. .	70,988
Mink .. .. .	24,441
Musquash .. .. .	173,942
Opossum .. .. .	414,559
Pony .. .. .	6,926
Skunk .. .. .	140,226
Squirrel .. .. .	219,005
Wolf .. .. .	8,660

To combat the gradual disappearance of many fur-bearing animals, amongst which may be mentioned the sable, seal, chinchilla, beaver, and silver fox, numerous animal farms have been established, this branch of the fur trade coming more and more into the picture. Now 90 p.c. of the silver foxes are "farmed" skins; and Persian lambs, imported into S.W. Africa from Bokhara, some 20 years ago, are now produced on the African farms.

Raw skins go through many processes before they are ready for human wear. Experts sort and value the skins, which are then fleshed, i.e. cleaned of fat, etc., by

round revolving knives. Next they are placed in a bed of grease, oil, yolk of egg, butter, or some greasy substance, and subsequently pounded in a treading vat, which causes the grease to enter the pores of the leather. Hot sawdust of beech or mahogany is rubbed in with the effect of drying the grease. Machines then unhair certain skins, i.e. take away the long coarse hairs, leaving only the soft and silky down. Thereafter such as are intended for dyeing are immersed in dyeing vats. Finally, skilled craftsmen deal with the skins, which, when manufactured into garments, become furs.

Of these craftsmen, the first and most important is the assorter, a highly trained specialist. His task is to select such skins as will work up together. Colour, length of hair, quality, texture, grounding, leather, and cost—all must be considered; and to get a perfect match he frequently rejects hundreds of skins. The selected skins are sent to the cutter, with whom work one or more nailers, men who with knives and nails skilfully work the skins to the pattern accompanying the order. Sewers, using a variety of machines, and subsequently liners and finishers are employed, and designing goes on incessantly. Moth, the great enemy, is kept under by beating the furs or by cold storage, which is more effective.

**Furetière, ANTOINE** (1619–88). French writer. Born at Paris, Dec. 28, 1619, he entered the Church, becoming abbé of Chalivoy and prior of Chûnes. He wrote satirical poems, a book of fables, 1673, and is chiefly remembered for his humorous story, *Le Roman Bourgeois*, 1666, written to cast ridicule on the romances of aristocratic gallantry then in vogue. He was elected a member of the French Academy in 1662, but was expelled in 1685 for preparing a dictionary, a work which the academy regarded as its exclusive privilege. He died May 14, 1688, his dictionary being published in 1690.

**Furfurane** or **FURANE**. Compound produced by distilling barium pyromucate with a soda lime or by heating pyromucic acid at its boiling point. It is also known as tetrol, tetraphenol, and tetrane. It is contained among the distillation products of pinewood tar.

**Furies** (Lat. *Furiae*). In classical mythology, the name under which the Romans knew the Eumenides (*q.v.*).

**Furka**. Mt. road of Switzerland, in the Valaisian Alps. It runs between the upper Rhône valley



and that of the Reussau, leading past the Rhône glacier to Andermatt, in canton Uri. Its maximum height is 7,991 ft.

**Furlong** (A.S. *furlang*, furrow-long). British measure of length, one-eighth of a mile, or 220 yds. The name is derived from the old English furrow length. A square, each side of which was a furrow 220 yds. long, contained 10 acres. See Acre.

**Furlo Pass** (anc. *Intercisa* or *Petra Pertusa*). Tunnel through the Apennines in Perugia, Italy. It is on the road from Rome to Ariminum, the ancient Via Flaminia. It is about 40 yds. long, 14 ft. high, and 17 ft. wide, and, according to an inscription cut in the rock, was made by order of the emperor Vespasian in A.D. 77.

**Furlough** (Dutch *ver lof*, for leave, or *oorlof*, permission, sanction). Term formerly used to designate the permitted absence from duty of military personnel, now referred to as leave (*q.v.*).

**Furnace** (Lat. *formus*, oven). In the general sense, term applied to any device which is used for raising heat, whether for steam, for chemical processes such as roasting of ores or lime, or for the manufacture of metal. The metallurgical usage is by far the most common. Furnaces have been designed and used for metal smelting for many centuries, references being made to them in the O.T. and in the literature of the ancient Greeks. Archaeologists have found ancient bronze and copper weapons which were made by casting molten metals. Since the industrial revolution, design of furnaces has grown and broadened until it is impossible to name the hundreds of types used.

Furnaces fall into three main classes. The first and often the cheapest to construct is the type in which the heat is transferred directly from the burning fuel, flame, or hot gases, to the material to be heated. This differs from the second type, in which the charge is separated from the heating medium by some form of container, such as a crucible or muffle. The third class is the electric furnace (*q.v.*), distinct in that it uses no fuel as such. In reality it may be classed with the others, for the arc-type of electric furnace forces the heat directly into the charge, and so fuel and charge may be said to be mixed, while induction or resistance furnaces employ a crucible, tube, or muffle. Even so, in many induction furnaces the material to be heated supplies the

necessary resistance, so that these fall into the first rather than second group.

The first class of furnaces is the commonest found in industry. Design depends on the type of fuel used—solid, liquid, powdered solid, or gaseous—on the form of the material to be heated, temperatures to be attained, products desired, and numerous other factors. In blast furnaces and cupolas (*q.v.*) the charge is mixed with the solid fuel itself. Their chief disadvantage is that the products of combustion, ashes, and flue dust are carried down with the metal and must be slagged off. All pig iron used in steel making comes from blast furnaces, which may run for several years without interruption. Some roasting furnaces employ similar principles, but most of the fuel for combustion is supplied by the ore itself in the form of sulphur.

#### Reverberatory Furnaces

Contamination from the ash is reduced in the reverberatory furnace (*q.v.*), in which the hearth containing the metal to be heated is separated from the fuel bed, the products of combustion being led over the charge. The hot gases impinge on the roof and sides of the furnace, which then reverberates heat down on to the mass of material to be heated. Reverberatory furnaces may also be fired by liquid fuels or frequently by pulverised anthracite or coal, which is forced through special burners at one end of the furnace. These are used not only for the roasting of ores to remove sulphur, arsenic, antimony, etc., to provide a material amenable to smelting, but also for the smelting itself of copper, lead, tin, nickel, and other metals. Open hearth furnaces (*q.v.*), most widely used in modern steel production, work on a similar principle, but the gases and air for combustion must be preheated in regenerators or recuperators; these use the heat left in the gases after they have passed over the melt, which would otherwise be wasted.

Typical of the second class are muffle furnaces, used for heat treatment of metals; kilns (*q.v.*), for calcination and roasting; and the many forms of crucible furnace, for melting ferrous and non-ferrous alloys for casting in the foundry. They are usually fired by gas, oil, or pulverised coal in injection; heating is rapid, while they have the advantages of easy manipulation and control and complete separation of the molten

metal from the furnace gases. Thick crucibles or muffles mean heavy heat losses through the walls, but with modern refractory materials this is cut to a minimum. Another example of this type is the retort or still, used in the production of mercury, zinc, cadmium, arsenic, etc. As these metals volatilise at fairly low temperatures, they or their compounds may be distilled from the ore and condensed to produce metal, which may be redistilled for higher purity. Small gas-fired or electric furnaces are used in laboratories for testing, where accurate control of temperature is needed. See Boiler.

**Furneaux**. Group of islands between Tasmania and Australia in Bass Strait. They were discovered in 1773, by the English navigator Tobias Furneaux. Flinders Island, the largest, is 35 m. long and 10 m. broad.

**Furness**. District in the N.W. of Lancashire, England. It is detached from the main portion of the county by Morecambe Bay. Its area is 250 sq. m. The hematite iron ore in the S. of the district was worked by the Romans. Lake Coniston and much of Windermere are in Furness, which claims the finest scenery in the co. The rly. serving the mineral district round Barrow was called the Furness Railway until merged in the L.M.S.

**Furness, CHRISTOPHER** FURNESS 1ST BARON (1852–1912). British shipowner. Born April 23, 1852,



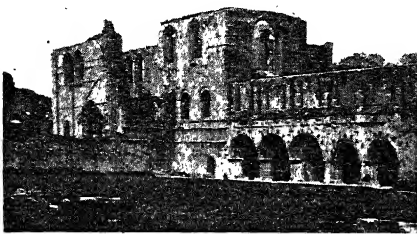
1st Baron Furness,  
British shipowner  
Russell

at West Hartlepool, he became a shipbroker in 1876, establishing soon afterwards the Furness line of steamers. In 1885 he went into partnership with Edward Withy, of Hartlepool, the firm being known as Furness, Withy & Co., and developing a huge business as shipbuilders and engineers. He was Liberal M.P. for Hartlepool, 1891–95 and 1900–10. Knighted in 1895, he was raised to the peerage in 1910, after losing his seat as an M.P. through a minor technical offence against the laws of election procedure. In religion a Methodist, Lord Furness was responsible for several philanthropic schemes and started a co-partnership scheme among his employees. He owned over 30,000 acres in Yorkshire. He died Nov. 10, 1912.

His son Marma-  
duke (1883-  
1940) was  
head of  
Furness  
Withy &  
Co. from  
1914 to  
1919, when  
he started  
the Furness  
Shipbuilding Co. Made a viscount  
in 1918, he died Oct. 5, 1940 and  
was succeeded in the title by his  
son William (b. 1929).

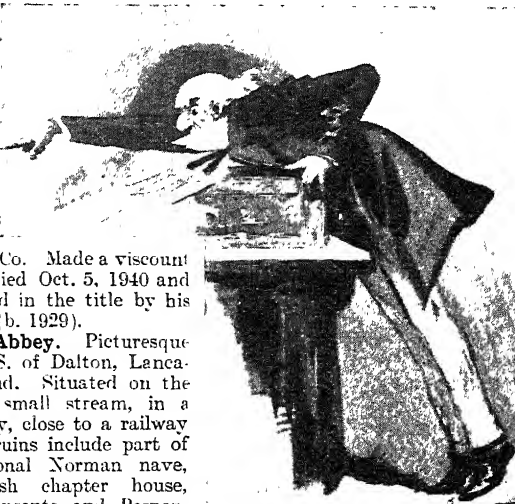
**Furness Abbey.** Picturesque  
ruins, 1 m. S. of Dalton, Lanca-  
shire, England. Situated on the  
banks of a small stream, in a  
wooded valley, close to a railway  
station, the ruins include part of  
the Transitional Norman nave,  
Early English chapter house,  
decorated transepts, and Perpen-  
dicular belfry and presbytery. In  
the abbot's chapel are two 12th  
century effigies of knights in  
armour. The abbey, dedicated to  
S. Mary, was founded in 1127 by  
Benedictines from Normandy,  
under the patronage of the earl of  
Morton, afterwards King Stephen,  
and became Cistercian in 1148.  
The abbot had feudal powers over  
the whole surrounding district,  
and the foundation was richly  
endowed. Lord Richard Cavendish  
(1871-1946) presented Furness  
Abbey to the nation in 1920.

**Furness Line.** British steam-  
ship company. It was founded by  
Sir C. Furness, afterwards Lord  
Furness, in 1877, the present  
company of Furness, Withy & Co.  
being registered in 1891. Associates  
and subsidiaries include the Prince  
Line; Cairn Line; Johnston War-  
ren Lines; Shaw, Savill & Albion;  
Furness Houlder Argentine Lines.  
These operate passenger and cargo  
lines to S. America, Newfoundland,  
Bermuda, W. Indies and Trinidad,  
Mediterranean, Black Sea, and  
Palestine ports, South Africa,  
Australia and New Zealand.



Furness Abbey. Ruins of the 12th century building  
of a former wealthy and powerful Cistercian abbey

Valentine



Furniss. One of his famous carica-  
tures of Gladstone

The head office is at 56.  
Leadenhall Street, London, E.C.3.

**Furniss, HARRY** (1854-1925).  
British caricaturist. Born at Wex-  
ford, of Anglo-Scottish parents, he

came to London in 1878. He con-  
tributed sketches to *The Illus-  
trated London News* and joined  
the staff of *Punch* in 1880, at  
Burnand's invitation, as illustrator  
of *Essence of Parliament*. In  
this capacity he created the  
legendary Gladstone collar. His  
connexion with *Punch* lasted until  
1894, when he started his own  
weekly, *Lika Joko*. This was not  
a success, nor was the short-lived  
periodical *Cartoon*, which he  
launched in 1915. He illustrated  
Lewis Carroll's *Sylvie and Bruno*;  
the works of Dickens, 1910, and  
Thackeray, 1911; and wrote *Con-  
fessions of a*  
*Caricaturist*.  
1901; *Harry*  
*Furniss at*  
*Home*, 1903;  
*Poverty Bay*,  
a novel, 1905;  
*How to Draw*  
*in Pen and*  
*Ink*, 1905. He  
died Jan. 14,



Harry Furniss  
Russell

1925. In the  
same year appeared his reminis-  
cences, a volume entitled *The*  
*Two Pins Club*. See *Caricature*.

## FURNITURE: AN HISTORICAL SURVEY

Hamilton Temple Smith

*A brief description of the origins and development of the movable  
contents of domestic buildings, with particular reference to English  
forms, but with notes also on the Continental modes and their influence  
on English furniture makers. See also separate articles Bed:  
Chair: Table, etc.*

The earliest known records of  
domestic furniture are Egyptian  
bas-reliefs dating from about  
4000 B.C., in which beds, tables,  
chairs, and stools are depicted.  
At a very remote period the craft  
of cabinet making was brought to  
a high state of development by  
the Egyptians. Dovetails and  
mortise-and-tenon joints were in  
common use. Glue was used, not  
only for strengthening the con-  
struction but also for decoration  
by veneering and inlay, sometimes  
with rare and lovely woods, some-  
times with ivory (often  
dyed) and other semi-  
precious materials. Painting and gilding  
were favourite methods  
of decoration: very  
rich examples of these  
were found in the tomb  
of Tutankhamen (q.v.).  
A common wood was  
sometimes painted and  
"grained" to resemble  
a more costly one. The  
usual type of receptacle  
was the coffer or chest,  
the lid sometimes

sliding in a groove and often of a  
domed or roof-like shape.

The design of much Egyptian  
furniture was of the most sumptu-  
ous kind, especially that of  
chairs and thrones. Besides being  
elaborately carved, painted and  
gilded, or inlaid, these had large  
feather cushions covered with rich  
stuffs of gold and silver tissue, or  
embroidered with silk and threads  
of gold, and supported upon a  
web of interwoven thongs or cords.  
Ramesses III (c. 1230 B.C.) is por-  
trayed sitting upon a throne with  
X-shaped supports, evidently con-  
structed upon the same principle  
as a deck chair of today, but of  
the greatest elegance. Legs were  
often shaped to represent the legs  
of animals—far-off ancestors of  
the cabriole leg of 18th century  
Europe. Bronze was frequently  
used as an alternative to wood  
for many pieces.

The influence of Egyptian cul-  
ture spread to Greece through the  
Phoenicians, and it seems, from  
the evidence of their sculptures  
and vase paintings, that, though  
their furniture remained simple

and sparse (*cf.* Homer's *Odyssey*), the Greeks achieved in the design of their furniture (as in architecture and the other arts) an unequalled refinement and purity of line and form.

The Romans who, in their turn, borrowed from the Greeks, soon exceeded them in domestic luxury, though not in artistic merit, and after the sack of Corinth in 146 B.C. Greek craftsmen flocked to Rome for employment. Two hundred years later the bronze chairs, stools, and couches buried in the ruins of Pompeii still showed clear evidence of their derivation from Greek designs.

#### Early Civilizations

During all these centuries, the range of furniture remained substantially as it had been during the early Egyptian dynasties: namely, chairs, stools, beds and couches, tables, and coffers. Moreover, while details of style varied widely between one civilization and another, the forms remained fundamentally the same. Indeed, the forms of many of them so closely resemble those of corresponding pieces today as to give the impression that modern furniture can claim unbroken descent from that of the early civilizations: but this is only partly true.

The Romans, colonizing most of the known world from Britain to the Persian Gulf, took with them everywhere the culture which had been developing since the dawn of history in Mediterranean lands. With the fall of Rome in the 5th century A.D., what remained of Roman civilization found refuge in Byzantium, whence its influence (in a modified form) spread slowly westward again through many troubled centuries. Meanwhile, in the west, civilization was swept away by successive waves of barbarian invasion, and the making of furniture, with the other domestic crafts, had to start all over again from primitive beginnings.

Such furniture as the Anglo-Saxons had was to be found in the chieftain's hall, the centre of their communal life. The 8th century poem *Beowulf* gives a glimpse of it: "Countless nobles guarded the hall . . . They cleared away the bench boards: it was strewn throughout with beds and bolsters . . ." About the time of the Norman conquest, the furniture of the hall still consisted of benches, trestle tables, and strong iron-bound chests which served for seats as well as safes. Chairs are shown in the Bayeux tapestry,

but at this period, and long after, the chair was a rarity whose use denoted rank or eminence, as the throne denoted royalty, and ordinary folk had to be content with stools.

As conditions became less primitive, and life more settled, comfort began to be studied. A back was added to the bench or the chest, and it became a settle. The cup-board appeared—a kind of dresser upon which plate and other treasures could be displayed; doors were added, and by degrees the "cupboard" changed its form, so that it has now come to be a place for hiding things rather than displaying them. The medieval craftsman found means of enriching and beautifying all that he made. Thus the trestles of tables blossomed out into the cusps and trefoils characteristic of Gothic buildings; cupboards for storing food, which needed ventilation holes, were presently pierced with tracery like miniature church windows. Little if any domestic furniture of early medieval times has survived, but illustrations in illuminated manuscripts, paintings, and carvings give a clear picture of it. Woodwork of the period still existing in churches and cathedrals reflects the same idiom and makes it possible to visualise the setting of domestic life in the Middle Ages.

#### Carved and Gilded Oak

During the 14th and 15th centuries commerce and wealth increased, and in the houses of the nobles, the great churchmen, and the rich merchants, furnishings reached a high degree of luxury and splendour. Oak was the timber commonly used and carving its main enrichment, sometimes enhanced by gilding, but more generally by painting in the bright heraldic colours that are still to be seen (much dimmed by age) in the roof work of some medieval buildings. Iron hinges and locks were elaborately wrought. Bedsteads had testers of panelled wood and were resplendent with embroidered hangings and coverlets. The actual joinery, however, judged by later standards, was crude, and still only the rich had more than the barest minimum of furniture.

There was constant intercourse between England and the neighbouring Low Countries and France, where Gothic art developed along parallel lines. In Italy, and the south, the Gothic spirit had never taken root; there the older Byzantine culture had remained the chief influence in the arts, till the 14th century saw the dawn of the

Renaissance and the revival of the purer classical forms of ancient Greece and Rome. In the 15th century the Renaissance reached its zenith in Italy; its impulse was soon to permeate France, fostered by the cultural kinship of these two Latin countries, and by the numerous Italian artists and craftsmen employed by Francis I. He died in 1547, by which time the three great furniture schools of Lyons, Touraine, and the Île-de-France had reached the summit of accomplishment in the new manner.

#### Early Tudor Period

In England there was no such easy transition. Henry VII, Henry VIII, and Wolsey all employed Italian and other foreign artists and artificers, whose work fired the native craftsmen to experiment in the new fashion, though more than a century was to pass before this became fully naturalised. Gradually the "linenfold" panel, typical of early Tudor woodwork, gave place to panels carved with arabesques. But the Elizabethan cabinet-maker's balusters, Florentine scrolls, dolphins, and acanthus leaves would have seemed mere caricatures to the authors of their French or Italian originals. The structural form of Elizabethan furniture, at its best, remained Gothic; at its worst it threw composition to the winds, bulging out into monstrous shapes and gross ornamentation. Oak was still the favourite wood, often inlaid with geometric or floral patterns: in this work the English excelled.

Two innovations appeared at the beginning of the Tudor period: the drawer which in course of time was to have a profound effect upon furniture design; and the "shovel-board" or draw-leaf extending table—a simple and ingenious device which has come back into favour after three centuries of disuse. During this time, too, with the increasing diffusion of wealth, the demand for furniture spread through all classes of people.

Jacobean furniture repeated the forms of Elizabethan, with a marked falling-off in vigour and inventiveness, but James I's reign was notable for one new development: that of upholstery as a fixed part of the chair.

The few pieces that have survived from the troubled time of Charles I show an increasing purity of classical detail, perhaps due to the influence of Inigo Jones, the royal architect. The Baroque style, then reaching its height on the Continent, is reflected in the

introduction of the spiral—or "barley sugar"—turning.

Commonwealth furniture, made for use rather than display, had a sober comeliness, both in proportion and detail which is thoroughly English. The demand for smaller and more portable types produced the gate-leg table; turning was of simple baluster or columnar form, and there was little carving.

Charles II brought home with him the classical traditions of the French court, and at long last the full tide of the Renaissance reached England. Walnut—which can be worked with much finer detail than oak—became the favourite timber. Except in chairs, table legs, and mouldings, where it was used solid, walnut was generally veneered upon deal. *Marqueterie*, of French and Italian origin, was already highly developed before Dutch influence, under William III, superseded French for a while. Through the Netherlands came the cabriole leg, most characteristic feature in furniture design throughout the first half of the 18th century: the Dutch had borrowed it from the French, who, in their turn, had received from the Italians this adaptation of an ancient Roman convention inherited from Egypt and Assyria.

#### The Tendency Towards Curves

In the reigns of Anne and George I the cabriole leg went through many experimental phases before reaching its graceful maturity and, in harmony with it, there was a general tendency to introduce curves in place of the straight constructional lines which had hitherto prevailed in English furniture. This tendency, and with it the trend towards lighter and more delicate forms, was encouraged by the introduction of mahogany, which, with its strength and fineness of grain, was exactly suited to the new vogue; great quantities of this wood were imported from the West Indies until it largely superseded the native walnut.

The later 18th century, the "golden age" of English furniture, is dominated by the figure of Thomas Chippendale (*q.v.*), a practical cabinet-maker who became the most successful furnisher of his day. In 1754 he published *The Gentleman and Cabinet-maker's Director*, containing 160 plates of his designs for a great variety of pieces. This had a wide circulation and was used as a pattern book by cabinet-makers in all parts of the country. Thus the elaborate (and

often fantastic) designs, invented by Chippendale for his aristocratic patrons, were adapted, simplified and produced by other hands for numberless middle class customers up and down the land. These productions varied considerably in quality of workmanship, but works of even unknown makers of this period are prized (and quite often justly) as outstanding examples of design.

#### Hepplewhite and Sheraton

Hepplewhite published *The Cabinet-maker and Upholsterer's Guide* in 1788, while Thomas Sheraton produced more than one similar volume, the first in 1791. There is no direct evidence that Hepplewhite had any workshop of his own; Sheraton almost certainly had not: they were free lance designers, and their designs were carried out in great numbers by competent master cabinet-makers, of whom some 2,000 have been identified in London alone during the 18th century.

Chippendale had borrowed many rococo details from the France of Louis XV, translating them into more domesticated forms to suit the English taste. His later work, produced in association with the fashionable architect, Robert Adam, reflected the current swing back towards straight lines and classical ornament.

The tides of foreign influence had ebbed and flowed continually around English design, which selected what details it needed, absorbing them into the strong native tradition evolved throughout the centuries. In furniture this English tradition came to full maturity in the work of Hepplewhite and his younger contemporaries, and continued at its prime for rather more than twenty years.

Regency furniture, elegant and sophisticated, marks a decline: never had taste been more eclectic, nor workmanship more competent, but the end of the golden age was near: well before the Great Exhibition of 1851, tradition had disappeared in a welter of styles and fashions, and only the habit of fine workmanship remained to show that a famous golden age had ever existed.

Half a century later William Morris began the search for a way back to tradition in the crafts. Among his followers were some young architects—among them Voysey and Mackintosh—who experimented in designing furniture suited to the kind of houses they were building. The most outstanding was Ernest Gimson, who set

himself to master the craft of woodwork, and at his renowned Cotswold workshop, during the first two decades of the 20th century, produced furniture unsurpassed for beauty of design and perfection of workmanship.

This English "arts and crafts" movement had a profound and immediate effect upon Continental designers and manufacturers, who (unlike the English furniture trade which ignored it) saw in it the beginning of a new and vital adventure. In England a few craftsmen, in small workshops up and down the country, were developing a contemporary style of design based upon fine craftsmanship. Meanwhile, the furniture trade in general cut itself off from all contemporary impulses, turning out endless copies of designs disintegrated from its own past. For many years there was only one man in it—Ambrose Heal—who took the new development seriously; then, between the two Great Wars, his example was followed by fresh entrants to the trade and, by degrees, established manufacturers began to be influenced by contemporary design. By 1939 a definite style could be recognized here and there, and at least the beginnings of a revived tradition, of which good proportion, straightforward construction, fitness for purpose, and the right use of materials were guiding principles.

#### Veneered Wood

Veneered laminated wood largely replaced solid wood in furniture construction. Plywood bonded with synthetic resin is exceedingly strong, durable and impervious alike to moisture and to insect attack. It can be readily moulded into curved shapes, and was so used in aeroplane construction during the Second Great War—experience tending to influence and modify considerably the traditional forms of mass-produced furniture, already improved and simplified in the designs used for utility (*q.v.*) furniture. Metal, both in pressed sheet and in tubular form, enamelled or chromium-plated, used for office, kitchen, and bathroom furniture, gave little indication of superseding wood as the accepted material for bedroom and living-room furniture.

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18th Century, H. Cescoinsky, 3 vols., 1911; Encyclopaedia of Furniture, H. Schmitz, 1930; Furniture and Furnishing, J. L. Rogers, 1932; A Key to English Furniture, H. P. Shapland, 1938; publications of Design and Industries Association.

**Furniture Beetle.** Small insect destructive to furniture and worked wood in general. The worm-holes on the surface of affected furniture are mostly caused by the beetles making their exit, whereas the actual destruction results from the boring activities of their larvae. The common furniture beetle (*Anobium punctatum*) attacks mature or old timber; its worm-holes are less than  $\frac{1}{16}$  in. in diameter. The death-watch beetle *Xestobium rufovillosum* mostly attacks beams and other structural timbers. Its worm-holes are  $\frac{1}{16}$  in. to  $\frac{1}{8}$  in. across. Its larvae have caused great damage to the rafters, etc., of Westminster Hall and other ancient buildings. The powder-post beetles (*Lyctus*) attack most hard woods. *Consult Furniture Beetles*, C. J. Gahan, 4th ed., 1946.

**Furnivall, FREDERICK JAMES** (1825-1910). A British philologist and editor. Born at Egham, Surrey, Feb. 4, 1825, he was educated at University College, London, and Trinity Hall, Cambridge, and was called to the bar in 1849. The publications of the Early English Text Society, founded by himself, like the New Shakespeare, Chaucer, Wyclif, Browning, and Shelley societies, have been of great service to students of English. His own most important work was an edition of Chaucer, and he was an originator of the Oxford English Dictionary. He took much interest in the welfare of the working classes and in the Working Men's College. Died July 2, 1910.

**Furnival's Inn.** Old London Inn of Chancery. It was on the N. of Holborn, between Brooke Street and Leather Lane. It dated from the reign of Henry IV, was rebuilt in the 16th century, and ceased its career as an inn in 1818, when it was again rebuilt. Dickens wrote the greater part of *The Pickwick Papers* when resident here. Its site is approximately that of the premises of the Prudential Assurance Co., built in 1879.

**Furring.** Deposition of mineral scale in vessels in which lime and

magnesium-bearing waters are heated. In the absence of evaporation the fur is composed of the carbonates of lime and magnesium which are precipitated at temperatures above 140° F. The scale in steam boilers and similar evaporators contains also the salts—sulphates, chlorides, and nitrates—which remain in solution even in boiling water. Fur may vary between the extremes of a firmly adhering, flint-hard, crystalline scale, and a soft, sand-like precipitate. It is highly undesirable because, being a poor conductor of heat, it serves as an insulator and impedes the transmission of heat from the fire to the water. A thickness of  $\frac{3}{8}$  in. is estimated to cause a 40 p.c. reduction in thermal efficiency. In pressure vessels, incrustation may bring about serious overheating and eventual failure. Furring may be prevented by water softening and other treatment; most processes remove the scale-forming matter from the water before it is heated, but others only ensure a soft precipitate by preventing crystallisation of minerals. *See Water Softening.*

**Furrow.** Trench or hollow made by the plough. It comes from an Anglo-Saxon word, and has been extended to describe hollows of other kinds, such as furrows on the face. *See Plough.*

**Furry Dance.** Correct local name of the celebration, May 8, at Helston, Cornwall. *See Flora Day*

**Furse, CHARLES WELLINGTON** (1868-1904). British painter. Born at Staines, Jan. 13, 1868, and educated at Haileybury, he studied art at the Slade School under Legros, and in Paris under Julien. In open-air portraiture he achieved rapid success, notably in *The Return from the Ride*, 1903, and *Diana of the Uplands*, 1904, a portrait of his wife (*v.i.*),

both in the Tate Gallery. A sportsman himself, he easily caught the atmosphere of country life, composing on a robust scale in bold, luminous masses of colour. He was elected A.R.A. in 1904, but died Oct. 17.

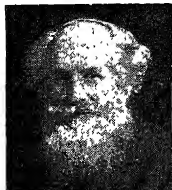
**Furse, DAME KATHARINE** (1875-1952). British organizer. She was born at Bristol, Nov. 23, 1875, the daughter of John Addington Symonds, and was brought up chiefly in Switzerland. In 1900 she married C. W. Furse (*v.s.*). Going to France in Sept., 1914, she developed the Voluntary Aid Detachments. She was director of the Women's Royal Naval Service, 1917-19; and director of the world bureau for girl guides and girl scouts, 1923-38. She was created G.B.E. in 1917. An autobiography, *Hearts and Pomegranates*, appeared 1940. She died in London Nov. 25, 1952.

**Furse, ROGER** (b. 1903). British designer. Born Sept. 11, 1903, at Ightham, Kent, he was educated at Eton. His settings for stage productions were outstandingly brilliant, *Victoria Regina*, 1936; *Oscar Wilde*, 1937; *Design for Living*, 1939; *The Skin of Our Teeth*, 1945. For the Old Vic he designed Shakespearian costumes and settings. His most notable film work was in *Henry V*, 1944. Furse was art director at Perranporth summer theatre, 1936-39; served in the Royal Navy during the Second Great War; and later returned to designing for the theatre, *e.g.* *The Mouse Trap*, 1952; *Macbeth*, 1955.

**Fürstenberg.** Name of two families of the German nobility, unconnected with each other. The Swabian princely house is the more important, though the Westphalian counts and barons have numbered several prince-bishops of Paderborn and statesmen of repute among their members. The later grand duchy of Baden was, 1136-1457, largely under the rule of the southern Fürstenbergs



Dame Katharine Furse, British organizer



F. J. Furnivall, British philologist  
Elliott & Fry



Furnival's Inn, London. View of the interior of the inn before its demolition  
From Wilkinson's *Londina Illustrata*, 1819

who thence until 1806 ruled a principality of their own, which is now mostly a part of Württemberg, with the capital at Donaueschingen. Large territories in Bohemia and Austria were held by younger branches of the family. Notable among the Fürstenbergs were Egon VIII, a general of the Catholic League during the Thirty Years' War, and his sons who backed Louis XIV against the emperor, both successively bishops and the younger, Wilhelm Egon, in 1686, made a cardinal. Maximilian Egon (1863-1941), personal friend of the Kaiser William II, was famous for his sumptuous hospitality and hunting parties at Donaueschingen.

**Fürstenbund** (Ger., league of princes). Term specially applied to the league formed by Frederick the Great in July, 1785, to maintain the existing constitution of the Empire as established by the treaty of Westphalia. The emperor Joseph II was pressing a scheme for securing Bavaria for himself and in exchange giving the Netherlands to the Bavarian ruler. Frederick persuaded the rulers of Saxony and Hanover—George III of Great Britain—to combine with him against this policy, and the league was joined by the elector of Mainz, the rulers of Brunswick, Baden, Hesse-Cassel, Mecklenburg, and others. It succeeded in stopping Joseph's project, but did not long survive the death of its mainstay, Frederick, in 1786.

**Fürstenwalde.** Town of E. Germany in the *Land* of Brandenburg. It is on the Spree, 32 m. E.S.E. of Berlin. A bishop's seat until 1571, its chief building is the cathedral. One of the oldest and richest towns in the prov., it owned a forest of about 12,000 acres. Metals, textiles, beer, and iron-founding provided its chief industries. Pop. 25,490.

**Fürth.** Town of Germany, in Bavaria. A rly. junction, 5 m. N.W. of Nuremberg, and linked with it by Germany's first railway, 1835, it stands at the confluence of the rivers Pegnitz and Rednitz. Its chief buildings are S. Michael's church and the town hall, as well as the ruins of a castle; other churches and several schools are nearly all modern. Its trade and population grew considerable between 1885 and 1914, its chief industries being printing and attendant trades, the making of mirrors, furniture, machinery, toys, and fancy goods. There was also a trade in agricultural produce, and an annual fair. Fürth had a large

Jewish population. At one time under the burghesses of Nuremberg and later the bishops of Bamberg, Fürth became part of Bavaria in 1806. Pop. (est. 1955) 101,028. *Pron.* (approx.) foort.

**Further Education.** Term used for instruction, higher, technical, or commercial, pursued after the end of primary and secondary schooling. The Education Act, 1944, defined further education as "(a) a full-time and part-time education for persons over the compulsory school age; and (b) leisure time occupation in . . . cultural training and recreative activities . . . for any person over compulsory school age." Further education includes dressmaking classes for housewives, shorthand evening classes for office workers, lectures on bee-keeping or gardening, as well as full-time courses in preparation for university degrees. Under section 42 of the Education Act, every local education authority must prepare and submit to the minister of Education schemes of further education for its area, to be carried out after consultation, and possibly in cooperation, with universities and other educational bodies providing facilities for further education in the area.

**School Attendance Compulsory.** The same Act required local education authorities to establish and maintain county colleges (*see* County College). Conditions when the Act was passed, and for some time afterwards, made it impossible to construct and staff county colleges immediately; but as soon as they were functioning attendance of young persons became compulsory, and employers were compelled to release them for such attendance.

Long before the passing of that Act, however, many employers, in conformity with the aims of the Education Act of 1918, allowed their juniors to attend, on one or more days a week, day continuation schools, the number so released for further general education amounting in 1946 to more than 100,000. Thousands of apprentices were also released for one or more days a week to continue their technical training. Employers paid wages for days spent in this way. Experience proved the value of this further education both to the juvenile and to the employer.

Institutions which have long offered opportunities for further education include the universities and university colleges, colleges of art, science, commerce, or tech-

nology, trade schools, polytechnics, technical colleges maintained by local education authorities, evening schools. The London and other county councils maintain technical, commercial, literary, art, and general institutes for further education, most of the classes being held in the evening.

Many students in evening schools concern themselves with a particular subject, and sometimes with a series of subjects in succession; but an increasing number take full courses with the object of securing a university degree, a professional diploma, or passing some other qualifying examination. The award of certain national certificates, e.g. in engineering, depends on satisfactory class attendance and homework during three sessions, and success in the terminal as well as the final examinations.

Besides technical and vocational subjects, literature, art, music, drama, crafts, civics and sociology are studied in leisure hours; and communal activities, such as discussion groups, amateur dramatic societies, etc., are encouraged by most local authorities. An institute of adult education was formed in 1946 to cooperate with such bodies as the Workers' Educational Association and the extramural departments of the universities to encourage the provision of university extension lectures and courses, and extend opportunities for the aesthetic, intellectual, and social development and expression of all beyond compulsory school age. *See* Education Acts.

**Furtwängler, WILHELM** (1886-1954). German conductor. Born in Berlin, Jan. 25, 1886, he was educated at Munich, and conducted operas and concerts at Breslau, Zürich, Munich, and Strasbourg, Lübeck (1911-15), Mannheim (1915-20). He made



Wilhelm Furtwängler.  
German conductor

his reputation as a musician of supreme knowledge and profound understanding during successive seasons with the Berlin state opera, 1920-22, the Tonkünstler orchestra of Vienna, and the New York Philharmonic orchestra, 1925-27. He made his first London appearance in 1924, with a British orchestra. He had a great success on several subsequent visits with the Berlin Philharmonic orchestra. Furtwängler acted as director of



concerts at Vienna, 1927-30, and Bayreuth, 1931, and 1936-37. He was cleared by a German "denazification" court, Dec., 1946, of a charge of collaboration with the Nazis, and allowed to resume his career. He died Nov. 30, 1954.

**Furunculosis.** Acute localised inflammation of hair follicles in the skin with *Staphylococcus aureus*. See Boil.

**Fury and Hecla Strait.** Narrow channel of the Arctic regions, separating Baffin Island from Melville Peninsula on the S. It contains numerous islands and communicates with the Gulf of Boothia on the W., and with Fox Channel on the E. Parry, the Arctic explorer, discovered the strait in 1822.

**Furze** OR **GORSE** (*Ulex europaeus*). Shrub of the family Leguminosae. It is a native of Europe, the Canaries, and Azores.



Furze. Left, seedling of *Ulex europaeus*; right dwarf furze, *U. minor*

It varies in height from 2 ft. to 8 ft., according to situation, and is densely covered with sharp evergreen spines, which are mainly transformed leaves. Young seedlings have trefoil leaves, and a single leaflet is sometimes attached to the long spines of older plants. The bright yellow, scented flowers are borne on the larger spines, which are twigs. The two-lobed calyx is yellow, like the petals, but covered with short black hairs. The black pods are about  $\frac{3}{4}$  in. long, and hairy. The seeds bear an oily attachment, known as an elaiosome, which is relished by ants, who convey the seeds to their runs to feed upon this part. By this agency the distribution of the plant is effected. The dwarf furze (*U. minor*), smaller in all its parts, is native only to Belgium, France, and Great Britain.

**Fusagasugá.** Town of Colombia, in the dept. of Cundinamarca. It stands at an elevation of 5,627 ft., 28 m. S.W. of Bogotá, and is locally known as the Cordilleran Paradise. A summer resort, it is

one of the chief coffee-growing centres of the country.

**Fusan.** Seaport of Korea. It stands at the S.E. extremity of the Korean peninsula, in S. Keisho division, on Broughton Strait, 7 m. from the mouth of the Nakdong river, and is the S. terminus of the rly. from Seoul (Keijo). Old Fusan is the native town and New Fusan was mostly inhabited by Japanese before the defeat of Japan in 1945.

Fusan, one of the treaty ports, opened to foreign commerce in 1883. The harbour is sheltered and deep, and the largest vessels afloat can approach the quay. Steamers normally ply to and from Nagasaki, Port Arthur, Vladivostok, Shanghai, Chemulpo (Jinsen), and other ports. The trade is connected with cotton fabrics, raw silk, Japanese wares, hides, rice, dried fish, petroleum, and beans. Of the fisheries the principal catch is herring and cod.

Fusan was the U.N. military base during the civil war in Korea 1950-53. About a sixth of the town was destroyed by fire in 1953. Pop. (1955) 1,045,183.

**Fusaro.** Lagoon of Italy. The ancient Acherusia Palus, it is in the prov. of Naples, 11 m. W. of Naples, and is separated from the sea by alluvial sand-hills. The Romans made an outlet for it in the 1st century A.D. During the Empire its banks were studded with villas, of which there are many remains, besides tombs. Then, as now, the lake was famed for its oysters.

**Fuse.** A device for bringing about the ignition or detonation of an explosive charge which allows a fixed interval of time before the charge explodes. The safety fuse used in mining operations consists of a train of black powder contained in a waterproof, woven textile tube and provides a means of communicating a flame from a distance to the charge to be fired. A crude form of safety fuse is the so-called "miner's squib," a tapered tube 7 ins. long, filled with fine gunpowder. Quickmatch fuse, now used mainly in fire-works, is made by soaking cotton wick in a solution of gunpowder

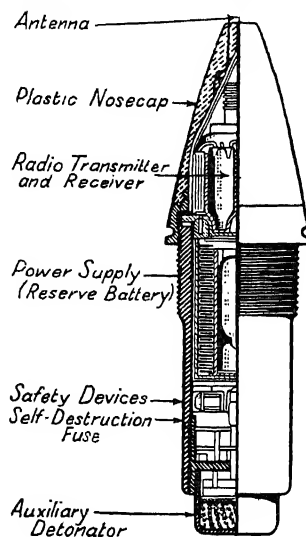
gunpowder when in the tacky state and finally wrapping in water-proof tape. Instantaneous fuse several strands of quickmatch in the same wrapping, burns at a speed of 200-300 ft. per sec. For a more rapid fuse the core



Fusan, the Korean port in the south-eastern extremity of the peninsula

consists of an explosive filling (Pentaerythritol tetranitrate or T.N.T.) which can be readily detonated.

Modern artillery employs over 100 different types of fuses, the principal being impact or direct action; graze action or percussion; time; and radio proximity. With military ammunition, such as shell or bomb, the charge is usually fired on impact with the target. The most usual direct action fuse is operated by a small pin held by a spring, which impinges violently on a detonator when impact occurs. Armour-piercing shells have a fuse set in



Fuse. Diagrammatic sketch of radio-proximity fuse for A.A. shells

the base, so that the shell does not explode till it has penetrated the target. The fuse holds the firing pin back by a balance system and is set off by the sudden retardation of the projectile on impact.

A.A. shells and bombs have time fuses, actuated either by a train of powder or by a clockwork mechanism. A major development of the Second Great War was the variable time fuse operated by radar. This was a tiny broadcasting and receiving set which exploded by radio reflection over the heads of troops or near an enemy aircraft or vehicle. The L. delay fuse depended on the time for a piece of lead alloy to break when stretched by a spring; it could be arranged for one hour or one month. Magnetic fuses in mines are set off by the movement of a sensitive needle under the influence of a ship's magnetic field. The fuse of the acoustic mine is actuated by the noise of the ship's engines.

Bombs dropped from aircraft and intended to explode upon striking the ground have a fuse in the tail fin which is set off by the sudden retardation of the projectile on impact. The fuses are armed by the unscrewing of fins by the air-stream while the bomb is dropping. Delayed-action bombs have either chemical or clockwork fuses. (*See Ammunition; Detonating Fuse; Explosives; Shell; Shrapnel.*)

**ELECTRIC FUSE.** This is an important element in the transmission and distribution of electric current. In all practical systems for the distribution of power it is necessary to provide something in the nature of a relief which will operate when excessive local stress or pressure threatens danger to the system. In a steam, water, or air system this relief is provided by safety-valves, supplemented frequently for steam by fusible plugs.

In an electrical system the relief is mostly provided by fuses

which are designed to carry the ordinary amount of current in a particular circuit, and to melt and break the circuit automatically should the current become so great as to heat the other parts of the circuit beyond the limit of safety. Hence the fuse is made of such materials and dimensions that its resistance is greater than that of an equal length of any other part of the circuit, and in consequence it is always, when current is passing, at a higher temperature than the rest of the circuit, while, its melting point being low as compared with that of the other materials of the circuit, it is also ready to give way first.

The material used for fuses is generally tinned copper wire, but an alloy of tin and lead is sometimes used. The fuse should be so long that when it goes there will be no risk of the formation of an arc across the space formerly occupied by the fuse—the current must be completely broken. The material should be such that it melts quietly without throwing splashes of molten metal where they may ignite anything and thus give rise to a fire. Hence the fuse is usually fixed between two hard brass clamps secured on a small slab of porcelain. Frequently the fuse is enclosed bodily in a porce-

plane, to which the mainplanes tail-unit, undercarriage, etc., are attached. The body of a flying-boat is correctly called the hull.

**Fuseli, HENRY (1741-1825).** Anglo-Swiss painter. Born Johann Heinrich Füssli, at Zürich, Feb. 7, 1741, and educated for the Church, he had to leave Zürich through the enmity of a public official he had exposed. He came to England in 1765, and secured the good offices of Reynolds, on whose advice he studied in Italy from 1770, and later returned to England. In 1782 he produced his gruesome and notorious picture, *The Nightmare*. Nine pictures for Boydell's Shakespeare gallery, and 47 for a Milton gallery of his own, were his other principal achievements. He became R.A. in 1790, lecturer on painting in 1799, and keeper in 1804. Despite the horrific nature of many of his drawings, he was a kind, mild little man. He helped William Blake, nearly 17 years his junior, who is thought by some to have derived certain of his inventions from Fuseli. Fuseli died at Putney, April 16, 1825.

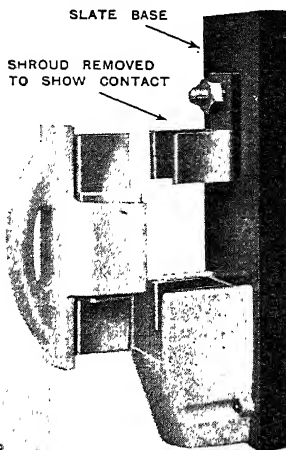


Henry Fuseli, Anglo-Swiss painter

**Fusel Oil.** Volatile liquid present in the products of the alcoholic fermentation of saccharine liquids. *See under Amyl.*

**Fusibility.** Name given to that physical property by virtue of which matter can be melted or rendered fluid if heated to a sufficiently high temperature under suitable conditions. It is due solely to this that objects can be cast in metal. While all the metals are fusible they melt at a range of temperatures, all the way from  $-39^{\circ}\text{C}$ . ( $-38^{\circ}\text{F}$ .), the melting point of solid mercury, to  $3,387^{\circ}\text{C}$ . ( $3,223^{\circ}\text{F}$ .), the approximate temperature at which tungsten melts. At whatever temperature the melting takes place it is always accompanied by the absorption of heat which becomes "latent" and a change of volume. Usually this change is one of expansion, but bismuth, for example, contracts in volume on fusion. *See Liquigation; Metal.*

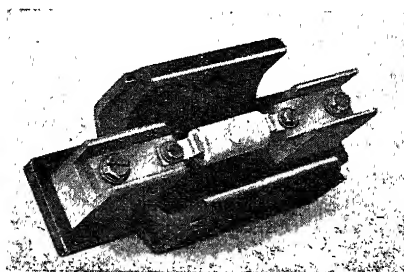
**Fusible Metals.** Metal alloys which melt at comparatively low temperatures. Newton devised such an alloy. One composed of 15 parts bismuth, 8 lead, 4 tin, and 3 cadmium, known as Wood's



SLATE BASE  
SHROUD REMOVED TO SHOW CONTACT

plain tube or case, while the space about it is packed with some non-conducting material which will effectually prevent the passage of a spark or the formation of an arc between the interrupted terminals when the fuse "blows."

**Fuselage** (Fr. *fuseau*, shuttle). Body of an aero-



Fuse. 500-ampere fuse handle with adapter plates and carriage fuse. (Top right). 800-ampere fuse handle and base.

metal, will melt at 155° F., and another (Rose's metal) composed of 8 parts bismuth, 8 lead, and 3 tin will melt at 203° F. Both these metals, therefore, will melt in boiling water. The "magic spoon" of the conjurer which melts in a cup of tea, is made of such a metal. By varying the proportions of the constituents, alloys of tin and lead, or tin, lead, and bismuth, can be made which will melt at from 202° F. to 380° F. Some are used to make fusible plugs for steam boilers and electric kettles. These plugs, being inserted in the furnace plates of a boiler, will melt if the plate becomes dangerously overheated, and, by permitting the steam to escape, may prevent a serious accident. They are also of use in electrotyping on account of their property of expanding on cooling, and so giving clean-cut impressions of moulds. See Alloy.

**Fusil** (late Lat. *facile*, steel for kindling fire). French term for the infantry magazine rifle, e.g. the *fusil Lebel*; also a light form of flint lock musket formerly used in the British army. In 1857 a sergeant's fusil was issued weighing 8 lb. 10½ oz. to fire the Enfield rifle ammunition, and in 1858 a smooth-bore fusil weighing 7 lb. 12½ oz. was issued to sergeants of native Indian regiments. The original was the *fusil mousquet* of Vauban. The *fusil mitrailleur* was a Belgian and Czecho-Slovak machine-gun. It was air-cooled and charger-fed. See Firearms; Flint Lock; Matchlock.

**Fusil**. In heraldry, an elongated lozenge. A fusil may be pierced. A shield divided by diagonal lines crossing each other so as to form acute pointed lozenges is said to be "fusily." See Lozenge.

**Fusilier**. Formerly the designation of special bodies of troops equipped with a fusil or light flint lock musket at a time when the matchlock was the standard military firearm. It is now only the distinctive regimental name of certain corps of infantry who are armed exactly the same as infantry of the line, though some battalions in the Second Great War provided machine-gun support companies, which were divisional troops.

The first mention of fusiliers occurs about 1643, when they were organized as companies during the Thirty Years' War. They were mounted, and differed only from the carabiniers in that they were armed with the flint lock musket. Following the lead set by France, various European armies introduced these troops of fusiliers between 1670 and 1680 to act as an

escort for the artillerymen, who were hired by contract for the campaign, an escort being considered desirable not only to protect them from hostile attack, but also to keep a close watch on them in case of treachery. As the cannon were served with loose powder from open barrels, it was not safe for the escort to be armed with muskets requiring the use of burning match; consequently the fusiliers were detailed for this duty.

General adoption of the flint lock musket made unnecessary the use of special troops as artillery escort, and, owing to the fusiliers having become accustomed to act as independent units, the regiments were largely employed as light infantry and not as line troops. The fusiliers were regarded as *corps d'élite* and the lowest commissioned rank was second lieutenant, the junior of whom took precedence of all ensigns; but at present they enjoy no privileges other than those of the infantry.

The senior fusilier regiment of the British army is the Royal Fusiliers (City of London Regiment), formed in 1685. The Scots Fusilier Guards relinquished the title fusiliers in 1877 and became the Scots Guards. Other famous British regiments of fusiliers are the Northumberland, Lancashire, Royal Scots, Royal Welsh, Royal Inniskilling, and Royal Irish. Distinctive of the full dress uniform of British fusilier regiments was the bushy or fur cap.

**Fusion** (Lat. *fusio*). Term referring to the change of state from solid to liquid, i.e. liquefaction or melting of a substance. The temperature  $T_m$ , at which the transformation takes place is known as the melting point; this is well defined for a crystalline material, but less definite for glass or pitch. The melting point, in contrast to the boiling point, shows a slight variation with pressure.

The amount of heat required to be imparted to unit mass of the solid to transform it into the liquid phase at the melting point is known as the latent heat of fusion,  $L_m$ . A knowledge of this latent heat gives directly the difference in the internal energy of the substance in the liquid and solid phases, and the ratio  $\frac{L_m}{T_m}$  gives the entropy of fusion.

In metals the value of  $L_m$  is only 3 or 4 p.c. of the latent heat of vaporisation, whereas in molecular substances it may exceed 20 p.c. See Freezing Point; Melting Point.

**Füssen**. Town and health resort of Germany, in Bavaria. It is on the left bank of the Lech, 56 m. S. of Augsburg. It dates from an early period, the Benedictine abbey of S. Magnus, it is said, having been founded here in 629, and was a town by 1300. Its principal centre of interest is the 15th century castle of the bishops of Augsburg, which stands on an eminence overlooking the town. A treaty during the War of the Austrian Succession was signed here in 1745. The church of S. Magnus, dating from 1701, was constructed on an older foundation, a Romanesque crypt. Near by is the Calvarienberg (3,130 ft.). Pop. 6,315.

**Fust** or **FAUST**. JOHANN (d. 1466). German printer. With Johann Gutenberg, and Gutenberg's



Johann Fust,  
German printer  
From a print

son-in-law, Peter Schoeffer, Fust, who is not to be confounded with the Faust of German legend, was prominent in the introduction of typographical printing in Ger-

many. He was a wealthy goldsmith of Mainz, and financed Gutenberg's printing office there. He foreclosed on a mortgage and carried on the business with Schoeffer, one of the masterpieces of this partnership being a Latin Psalter, 1457, whose initial letters were printed in red and blue. Fust died in Paris of the plague.

**Fustel de Coulanges**, NUMA DENTS (1830-89). French historian. Born March 18, 1830, and educated in Paris, he studied for a time in Greece and then returned to France to teach and study history. During 1860-70 he was professor at Strasbourg, after 1870 he lectured in Paris. In 1878 he was made professor of medieval history at the Sorbonne, and from 1880 until his death, Sept. 12, 1889, was director of the École Normale. Fustel was probably the most able and certainly the most uncompromising of his torians who combated the theory that the early institutions of France were mainly of Teutonic origin. In six volumes he showed how the influence of Rome survived there, and how the Teutonic invaders did little more than fall under it. Fustel's best-known work, however, is *La Cité Antique*, 1864, which claims that religion

was the chief force in the development of the ancient states of Greece and Italy.

**Fustian.** Thick short-piled cotton fabric, mostly used for workmen's clothes. The term is applied to clothes of the nature of velvet e.g. velveteen, moleskin, and corduroy. The early fustians seem to have been made of cotton or of cotton weft and linen warp. The manufacture of fustian was apparently introduced into England in the 14th century by the Flemings the first English-made fustians being woollen. Spain and Italy were noted for their fustians those made at Naples becoming so popular as to be specially described as fustian of Naples, a term which became corrupted into such strange forms as fustian anapes fustian and apes, fustianapes, and fustniapes. The name fustian is said to come from Fostat, near Cairo, where the stuff was made. Rum fustian is an old Oxford university "night-cap," a kind of egg flip. The use of the word for pompous or unseasonably lofty language is due to the idea of stuffing or padding.

**Fustic.** Name given to two yellow dye materials known respectively as old fustic, obtained from the wood of *Maclura tinctoria*, and young fustic from *Rhus cotinus*. Both plants are grown in the West Indies, but young fustic is also found in S. Europe. The colouring matters from young fustic are called fustin and fisetin, whilst those from *Maclura tinctoria* are morin and maclurin. In wool dyeing fustic is a natural yellow dye.

**Fusulina Beds.** In geology, great thicknesses of limestone, made up to a great extent of fossil remains of chambered shells of Foraminifera, including species of *Fusulina*. They are well developed in carboniferous rocks of Russia and the Ural Mts., and in Japan, China, and N. America.

**Futa Jallon** or FOUTA DJALLON. Region of French W. Africa, forming the N.W. portion of French Guinea. Area, 42,000 sq. m. It is a mountainous country, rising in parts to over 5,000 ft., with fertile valleys, containing the head-streams of the Gambia, Senegal, and Niger rivers. Cattle, sheep, and horses are raised in large numbers, and cereals, coffee, and cotton are produced. The rly from Kankan, on the Milo tributary of the Niger, and Karussa on the Niger, to the port of Konakry touches Timbo, the capital, in the S. part of the territory. The inhabitants are Muslim Fulas,



Futurism. La Modiste (the dressmaker), a Futurist painting by Gino Severini, exhibited at Paris in 1912

who settled here in the 16th century. See Guinea, French.

**Futures.** Business term for goods to be shipped at some future time. Merchants and others speculated in futures, especially of corn, cotton, hops, etc., variations in freight rates and in market conditions generally providing an ample gambling element. The word was confined in practice to foreign produce.

**Futurism.** Name given to an art movement which originated at Turin in 1910. It owed its inception mainly to F. T. Marinetti, the Italian poet. It preached the renovation of Italian art, declaring that art could live only by its emancipation from the past. It repudiated tradition, academic training, museums, picture galleries, the art of previous ages, and other similar "fetters" on art progress. In literature, experiments were made by Marinetti and others to convey emotions directly to the reader's eye by the use of varying types, suggestive arrangements of spacing and lines, and other devices. An account of scenes in the Balkan Wars, 1912-13, was written by Marinetti and read to an accompaniment of drums, crashing metal instruments etc. Futurism tried to introduce into the art of painting a "poetry of motion," whereby, for example, the painted gesture should cease to be a fixed momentary thing

and become actually "a dynamic condition." The weakness of the proposition lies in the fact that kinetics cannot be realized by static qualities. Successive scenes witnessed, for instance, from a train in motion were depicted on a canvas as though they had been simultaneous, the result being confusion. This aim was further complicated by a sort of psychological bias which was expressed in the Futurists' effort to indicate, in the painting of a scene, not only the state of mind of the painter but also that of the person or persons

depicted in the picture.

A picture, according to the Futurist manifesto, "must be a synthesis of what one remembers and what one sees." Thus a Futurist would paint not only what he saw before him, but would combine with it the recollection of previous scenes which lingered in his mind, and also attempt to give, in the same picture, some idea of the sitter's sensations. These sensations were to be represented by "force lines and rhythms." Objects and personages were to be studied from all sides so that all aspects of things, visible and invisible, front and back, should be painted in a picture. The results were frequently ludicrous.

Original Futurists included Marinetti and the Italian painters Boccioni, Carra, Russolo, Balla, and Severini. Their first exhibition was held in 1911 in Paris, whence it was transferred to London. In the light of subsequent events it was clear that Futurism possessed to a considerable degree some of the prophetic marks of fascism. In Italy the movement emerged with a political as well as an aesthetic creed, and was the manifestation of a bombastic worship of the machine and brute force. See Cubism.

**Fuyong.** Chinese dish of egg served in the form of an omelette and suitably garnished with various mixed vegetables.

**Fyen**, FYN, OR FÜNEN. Island of the Baltic Sea, forming part of Denmark. It lies between Jutland and Zealand, ranking next to Zealand in size, and is separated from the mainland by the Little Belt, and bounded E. by the Great Belt. Length 52 m. by 42 m. wide; area 1,133 sq. m. Flat for the most part, with a much indented coastline, it rises in the S.W. to some 40 ft.

Well watered by the Odense and other streams, it is very fertile, producing fruits, cereals, flax, hemp, timber, cattle, and horses. The chief towns on the island are Odense (*q.v.*), the capital, Svendborg, and Nyborg.

Fyen was occupied by German troops on April 9, 1940, when Denmark was invaded during the Second Great War. It was a centre of resistance until its liberation on May 5, 1945. The Gestapo headquarters at Odense was destroyed by the R.A.F. on April 17, 1945.

**Fyfe**, ANDREW (1754–1824). British anatomist. Born near Edinburgh, he became in 1777 "dissector" to the professor of anatomy at Edinburgh University, and for some 40 years was in charge of the dissections and gave demonstrations at the anatomical school there. He wrote many text books which were long used as standard works in Edinburgh University teaching, and was an excellent draughtsman of technical drawings to illustrate his subject. He died on March 31, 1824.

**Fyfe**, SIR DAVID PATRICK MAXWELL. For this British lawyer and politician *see* Kilmuir, Viscount, the name he took on his elevation to the peerage.

**Fyfe**, HENRY HAMILTON (1869–1951). British journalist and author. Son of a barrister, he was born in London Sept. 28, 1869, and educated at Fettes. After varied work with *The Times*, he edited the *Morning Advertiser*, 1902–03, and the *Daily Mirror*, 1903–05. He was special correspondent of the *Daily Mail* all over the world during 1907–18, and also wrote the Amiens dispatch in *The Times* which gave first news of the reverse at Mons, Aug., 1914. In July, 1918, he took charge of British propaganda in Germany. Under his editorship, 1922–26, the *Daily Herald* increased in circulation. His first book, *A Player's Tragedy*, appeared in 1894; later came biographies of Northcliffe, 1930, and T. P. O'Connor, 1934, *History of the Next Hundred Years*, 1949; and the autobiographical *Sixty Years of Fleet Street*, 1949. His best-known play

was *The Kingdom, the Power, and the Glory*, 1920. He died at Eastbourne, June 15, 1951.

**Fyfe**, SIR WILLIAM (HAMILTON) (b. 1878). British educationist. Born July 9, 1878, he was the younger brother of H. Hamilton Fyfe (*v.s.*). Educated at Fettes and Merton College, Oxford, he was headmaster of Christ's Hospital, 1919–1930; principal and vice-chancellor of Queen's university, Kingston, Ont., 1930–36; principal and vice-chancellor of the university of Aberdeen, 1936–48, when he retired. He was chairman of the Scottish advisory council on education, 1942–46, and a member of the Scottish advisory council on the rehabilitation of offenders. His publications included translations of the histories and minor works of Tacitus, and Aristotle's *Art of Poetry*. He was knighted in 1942.

**Fyffe**, WILL (1887–1947). Scots variety artist. He first appeared on the stage at the age of six in a company managed by his father. His reputation grew as a comedian, and his impersonations of a ship's engineer and a Scottish centenarian were popular music hall sketches. Entering films, usually as a character actor, in the 1930s, he was in *Annie Laurie*, 1936; *Owd Bob*, 1938; *Rulers of the Sea*, 1940; *The Brothers*, 1947. He died Dec. 14, 1947.

**Fylde**. That part of Lancs, England, between the estuaries of the Wyre and the Ribble. A flat area devoted mainly to agriculture, it includes Fleetwood, Blackpool, and Lytham St. Annes. N. Fylde and S. Fylde are the names of two co. constituencies.

**Fylfot**. In heraldry, the cross gammadion, or crumponed cross. It is celebrated in occult science

and is a modification of the extremely ancient oriental swastika (*q.v.*). Each limb is terminated by a crutch-like protrusion to the right. This

is the lucky or beneficent fylfot; if the projections are reversed it is a "black" or evil sign. The word is probably a corruption of fill-foot, as a row of "fylfots" was used to fill a space at the bottom of a painted window.

**Fyne**. Sea loch of Argyllshire, Scotland. It extends S.W. and S. for 40 m. from above Inveraray to its mouth at the Sound of Bute, with a breadth of from 1 m. to 5 m.

Its arms are E. Loch Tarbert (with Tarbert village), Loch Gilp (with Lochgilphead, Ardrishaig, and the Crinan Canal), Loch Gair, and Loch Shira.

**Fyrd** (A.S., army). Name given to the army, or rather militia, of England in Anglo-Saxon times. It is first mentioned in the Anglo-Saxon Chronicle as existing about 600, and consisted apparently of all able-bodied men. They were called out in times of danger by the shireman or sheriff, each shire having its own fyrd. In the 7th century laws laid down penalties for neglecting this duty. Called fyrdwite, the fines varied, according to the rank of the offender, from forfeiture of his land to a moderate fine.

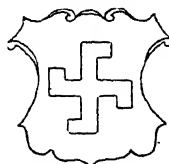
The fyrd was reorganized by Alfred the Great and was used to fight the Danish invaders. It survived the Norman Conquest, but was not used abroad, the idea that it was a defensive force only being very strong. It did good work at the battle of the Standard and in other fights against the Scots and Welsh, but from about the time of Edward I it was replaced by commissions of array and the militia.

**Fyt, JAN** (1609–61). Flemish painter. Born March 7, 1609, at Antwerp, where he also died, he studied under Jan van Berch. He achieved renown as an animal painter and was employed by Rubens, Jordaens, and De Crayer to introduce animals, especially dogs, into their pictures. Most European galleries contain examples of his art.

**Fytton**, MARY (c. 1578–1647). English maid of honour. Except that she was grand-daughter of Sir Edward Fytton, and one of an English family long associated with Gawsworth, Cheshire, little is known of her life. She became maid of honour to Elizabeth I about 1595, but, after a liaison with the earl of Pembroke, was dismissed the court. She has been identified, without much historical justification, with Shakespeare's "dark lady" of the sonnets.

**Fyvie**. Village of Aberdeenshire, Scotland. It is on the Ythan, 31 m. by railway N.N.W. of Aberdeen. The castle, once a royal mansion and then a home of the Gordons, was restored by Lord Leith of Fyvie (1847–1925) and has five towers. Traces exist of earthworks constructed by Montrose in his winter campaign of 1644.

**Fyzabad**. This is another spelling of Faizabad (*q.v.*), city of the Uttar Union, India.



Fylfot in heraldry

**G** is the seventh character of the English alphabet: its history begins only in the late 4th century B.C. The North-Semitic *gimel*, through the Greek *gamma*, passed into the Etruscan and Latin alphabets, and became C, which originally was used for both *g* and *k* (see under letter C). In a reform of the Latin alphabet attributed to Appius Claudius Censor and assigned to 312 B.C., the letter *z* (q.v.) being considered



superfluous for writing Latin was dropped from the Latin alphabet. It was replaced by a new letter, serving to denote the voiced guttural stop *g*; it consisted in the addition of a bar to the lower end of C, converting it into **G**. This letter is the direct ancestor of the capital **G** in use today, but the minuscule has passed through many modifications until today it bears very little resemblance to the majuscule letter

**G** Seventh letter of the English and Latin alphabets.

It is a soft guttural or throat sound, the corresponding hard letter being *k* (c). In English it has two sounds, the one hard, as in *gate*, the other soft, usually before *e*, *i*, and *y*, as in *gender*, *ginger*, *Egypt*. In the word *gaol* also it is pronounced as *j*. Before *n* it is mute, as in *gnat*, *reign*; and may lengthen the preceding vowel as in *resign*. The combination *gh*, when initial, corresponds to the first value of *g*, as in *ghost*; when medial, it is mute, as in *brought*, and sometimes when final, as in *bough*, though combined with *h* it often has the sound of *f* as in *rough*, *enough*.

**G**. Fifth note of the major scale of C. It is a perfect fifth above C, and is the dominant of the key of C. The treble clef sign was originally a form of the letter *G* and gives the name *G* to the line of the musical staff round which its central curl passes.



**Gabbro**. Basic igneous rock, somewhat similar in texture to granite, with a speckled or mottled appearance. Gabbro consists usually of plagioclase feldspar, augite, and often olivine, while many common varieties have varying proportions of iron- and magnesium-rich minerals. In the Inner Hebrides, Sweden, Norway, and Canada gabbro is common.

**Gabelle**. French word for an indirect tax, in ordinary use confined to the tax on salt. Salt was a state monopoly, and almost from its imposition before 1300 to the Revolution the tax on it was most oppressive, every family being compelled to purchase a weekly minimum of salt. Its incidence varied from province to province: one or two were exempt; in the others the price of salt was fixed by royal officials. At one period the prisons of Normandy were filled with persons unable to pay this imposition. One of the grievances which contributed to

the Revolution, it was abolished in 1790.

**Gaberdine** OR **GABARDINE** (Span. *gabardina*, smock, coarse frock). Loose garment, usually of rough, dark material, reaching to the ankles and girt with a cord. It was worn in the Middle Ages by pilgrims and mendicants and by Jews.

**Gabès** (anc. Tacape). Port of Tunisia. On the Gulf of Gabès, it is 90 m. S.S.W. of Sfax. The surrounding country is semi-desert. W. of Gabès are salt lakes or shats, extending for nearly 250 m. to within 50 m. of Biskra. There is trade in dates, oil, hides, and henna. Pop. (est.) 22,500

**Gabin**, **JEAN**. Professional name of Jean Alexis Gabin Moncorge (b. 1904), French actor. Born at La Villette, Paris, May 17, 1904, to parents in the theatrical world, he started work at 14 in an iron foundry near Creil. After six years there he spent three in the navy. Then he began to



Jean Gabin,  
French actor

present impersonations in cafés and music halls, and, attracting the attention of Mistinguett, appeared at the Moulin Rouge. He got his first film part in 1930 in a comedy, *Chacun sa Chance*. More film engagements followed rapidly: they included parts in *Maria Chapdelaine*, 1934; *La Belle Equipe*, 1936; the name part, outstandingly played, in *Pépé-le-Moko*, 1937, a tale of the Algiers Kasba; *La Grande Illusion*, 1937; *La Bête Humaine*, 1938; *Quai des Brumes*, 1938; *Le Jour se Lève*, 1939. A naval reservist, he was called up in 1939, escaped from Cherbourg to S. France in 1940, and in 1941 went to the U.S.A. where he made two films, *The Impostor*, 1943, and *Moontide*, 1944. He then joined the Fighting French, serving under Leclerc

until July, 1945, and winning the médaille militaire and the croix de guerre with palms.

Post-war films included *La Marie du Port*, 1949; *La Minute de Vérité*, 1952; *Touchez pas au Grisbi*, 1953; *French Cancan*, 1954 (in which he played a sophisticated impresario); *La Traversée de Paris*, 1956.

Gabin, who excelled in portraying working men—tough, brave, a little naïve, easily moved by sentiment, able to kill or be killed—could rivet attention even during virtual inaction.

**Gable** (old Fr., fork). Pointed or nearly pointed termination of a roof in the Gothic style. In classical architecture the gable is called a pediment. The simplest form of gable is the triangular. This came into vogue in the Middle Ages, as a result of the high-pitched roof, and, indirectly, of the vault which required such a roof. As Gothic tended towards luxuriance in detail, the severe triangular gable was enriched with ornaments such as the crocket and the finial, and in the 16th century, the transitional period of British architecture, the sides were formed in a succession of short curves. This curved form was adopted in the Netherlands and is popularly known as the Dutch gable. The main façade of Holland House, Kensington, built early in the 17th century, virtually destroyed during the Second Great War, was surmounted by a succession of these gables, consisting of two curves divided by a rectangular step on each side.

In another variety the sides are formed by a sequence of corbie-steps. When, as in the timber, or half-timber, buildings of the 16th century, the gable projected some distance over the wall, the edge or verge was ornamented with a barge-board. When the "hipped" roof, i.e. the roof made to slope back from all sides, was introduced in the latter part of the 17th century, the gable was no longer used except in farmhouses and buildings based on older architecture style.



**Gable, CLARK** (b. 1901). American film actor. Born at Cadiz, Ohio, Feb. 1, 1901, he was educated at Akron university, and later joined a repertory company. He began his screen career at the end of the 1920s, being placed under contract with M.G.M. studios.



Clark Gable,  
American film actor

His assertive personality, rugged appearance, and emotional range of acting made him a Hollywood star. Films in which he played leading parts included *The Painted Desert*, 1931; *A Free Soul*, 1932; *It Happened One Night*, 1934; *Mutiny on the Bounty*, 1936; *Parnell*, 1937; *Test Pilot*, 1938; *Idiot's Delight*, 1939; *Gone With the Wind*, 1941; *Adventure*, 1946; *Any Number Can Play*, 1949; *Across the Wide Missouri*, 1951; *Lone Star*, 1952; *Never Let Me Go*, 1953; *Mogambo*, 1954; *The Tall Men*, 1955. During the Second Great War he served in the U.S.A.A.F.

Gable married as his third wife the film star Carole Lombard (q.v.); as his fourth, 1949, Sylvia, Lady Stanley of Alderley (whose second husband had been Douglas Fairbanks, Senr.).

**Gablonz.** German form of Jabloniec (q.v.), a Czech town.

**Gaboriau, ÉMILE** (1833-73). French novelist. He was born at Saujon, Charente-Inférieure, Nov. 9, 1833. An acknowledged master of detective fiction, his clever story *L'Affaire Lerouge*, 1866, brought him instant fame. This was followed in rapid succession by *Le Dossier No. 113*, 1867; *Le Crime d'Orléans*, 1867; and other novels of the same type, which, though of slight literary value, hold the attention by their skilfully woven plots and abundance of sensational incident. He attained a European reputation as the originator of this type of detective fiction. Much of his work has been translated into English. He died Sept. 28, 1873. See *Detective Fiction*.

**Gabriel** (Heb. man of God). Name in Biblical and post-Biblical literature of one of the seven archangels. He was sent to Daniel to explain the vision of the ram and he he-goat (Dan. 8), and again to instruct him as to the "seventy weeks" (chap. 9). In the N.T. he is the divine messenger who predicts to Zacharias the birth of a

son to Elizabeth (Luke 1, vv. 8-20), and to the Virgin Mary the birth of the Saviour (vv. 26-38). Gabriel was named patron saint of telephonists and telegraphists, 1951.

**Gabun, GABON, OR GABOON.** Territory of French Equatorial Africa. It lies to the S. of Cameroons, and is bounded W. by the Atlantic Ocean, E. by the French Middle Congo territory, and S. by the Belgian Congo and the Portuguese enclave of Cabinda. French occupation on the Gabun river started in 1841, and in 1849 the settlement of Libreville was formed as a place of refuge for slaves.

French influence gradually extended, chiefly through the efforts of de Brazza and of French missions. In 1884 France took possession of the entire coastal region between Libreville and Brazzaville. In 1894 the boundaries between Cameroons colony and the French Congo regions were determined, but in 1911 Germany demanded, and received, as compensation for her recognition of the position of France in Morocco, a block of territory, the greater portion of which was taken from the Middle Congo and Ubangi-Shari-Chad colonies.

The present area of Gabun territory is 103,000 sq. m. It is administered by a governor, with an administrative council, subject to the governor-general of French Equatorial Africa, and contains vast forests and a large variety of tropical products, including rubber, palm kernels, and cocoa. There are rlys. from Brazzaville, the chief town of the Middle Congo to the W. coast and from Libreville, inland to Njole. Despite the lack of rly. communication there is a considerable trade along the rivers and through the ports of Libreville, the capital, Cape Lopez, Sette Gama, Mayumba, and Loango. The climate of the colony is unhealthy in the coastal regions, sleeping sickness prevailing, but comparatively healthy in the elevated interior. Pop. (est.) European, 3,800; African, 410,000.

Following the Franco-German armistice of June, 1940, Gabun adhered to the Vichy government. On Oct. 27 Free French troops, under Gen. de Larminat, advanced on Lambaréne which fell on Nov. 6. Libreville surrendered five days later; and Port Gentil, the last Vichy stronghold, on Nov. 12.

**Gad.** Seventh son of Jacob, by Zilpah the handmaid of his wife Leah (Gen. 30, vv. 10, 11). He had seven sons at the time he went down to Egypt with his father and brothers. Gad is also

the name of a prophet who acted as a counsellor to David (2 Sam., 24 v. 11; 2 Chron. 29, v. 25), and wrote a history of his reign (1 Chron. 29, v. 29); and of an Oriental divinity, regarded as the bringer of good fortune.

**Gadag.** Town of Mysore state, India, in Dharwar district, 44 m. E. of Dharwar town. It trades in cotton and silk and contains remains of temples. Pop. (1951) 65,509. It is the chief town in Gadag sub-division, area 700 sq. m.

**Gadara.** A town of ancient Palestine, included in the Decapolis. It stands among the hills on the E. side of the Jordan, 6 m. S.E. of the Sea of Galilee. Founded by Greeks, it was captured by Antiochus III, 218 B.C., and by Alexander Jannaeus, 100 B.C., when it was nearly destroyed. Pompey rebuilt it about 65-63 B.C. and it became friendly to Rome. It suffered from Jewish aggression in A.D. 66-70, but flourished thereafter until the Mahomedan conquest. It is mentioned in Mark 5, in connexion with the Gadarene swine. Extensive ruins include remains of theatres, and a colonnaded street; the tombs in the nearby cemetery are remarkable.

**Gaddi, TADDEO** (c. 1300-66). Italian painter. Born in Florence, he studied first under his father, Gaddo Gaddi, and under his godfather, Giotto. Few of his works survive. An altarpiece, *The Virgin and Child*, was in Berlin, and his fresco, *The Last Supper*, in the church of Santa Croce in Florence. The *Triumph of S. Thomas Aquinas* in Santa Maria Novella, Florence, attributed to him, has been ascribed to a Siennese painter. Deeply imbued with the spirit of Giotto, Gaddi maintained that master's tradition in painting.

Agnolo Gaddi (b. c. 1330), son and pupil of Taddeo, painted frescoes, e.g. at Holy Cross church, Florence; also altarpieces.

**Gade, NIELS WILHELM** (1817-90). Danish composer. Born at Copenhagen, Feb. 22, 1817, he became a violinist in the royal orchestra. In 1840 his overture *Nachklänge aus Ossian* brought him into notice as a composer. He assisted Mendelssohn in conducting the Gewandhaus concerts at Leipzig, but in 1848 returned to Copenhagen and devoted himself to composition and conducting, being *Kapellmeister* (director of the court orchestra), and professor and director of the musical union. He died Dec. 21, 1890. Gade's compositions include orchestral and chamber music, and cantatas.

**Gad Fly.** Name given to members of two groups of flies that harass cattle in summer, causing them to run wildly about the pastures. It is most often applied to the horse fly (*q.v.*) which pricks the animals with its piercing proboscis in order to suck blood. Sometimes it is used for the warble fly (*q.v.*), which is not blood-sucking, but alarms the cattle by its buzz when on the wing.

**Gadolinite.** A silicate of beryllium, iron, and yttrium ( $\text{Be}_2\text{FeY}_2\text{Si}_2\text{O}_{10}$ ), which may contain appreciable cerium, together with traces of other rare earth metals. Gadolinite is a greenish black mineral principally found in massive or prismatic crystal form in pegmatite veins, often associated with other minerals containing rare elements, such as allanite and yttrialite. It was investigated by J. Gadolin, Swedish chemist, in 1794—hence its name.

**Gadolinium.** A chemical element (Gd), one of the lanthanide group of rare earth elements. It is moderately soluble in a saturated solution of potassium sulphate. J. C. G. de Marignac in 1889 announced that he had isolated a new earth from the mineral samarskite by fractional precipitation with potassium sulphate. Since then workers have prepared its salts by fractional crystallisation of double nitrates, gadolinium nitrate being the least soluble in nitric acid of all the rare earth nitrates, and hence the first to crystallise out. The element is also found in gadolinite and orthite. It has the atomic number 64, and atomic weight 156.9. The oxide gadolinia,  $\text{Gd}_2\text{O}_3$ , is white and hygroscopic. Gadolinium is one of the less abundant of the rare earth metals and has no commercial use.

**Gadow,** HANS FRIEDRICH (1855–1928). German-born British zoologist. Born in Pomerania, March 8, 1855, he was educated at Frankfurt-on-Oder and at the Universities of Berlin, Jena, and Heidelberg. He settled in England, became naturalised, and in 1880 secured an appointment in the natural history department of the British Museum. He left that in 1882 and in 1884 was made Strickland curator and lecturer on zoology at Cambridge. Gadow's works include a *Classification of Vertebrata*, 1898; *Amphibia and Reptiles*, in the *Cambridge Natural History*, 1901; and, together with A. Newton, *A Dictionary of Birds*, 1893–96. He died May 16, 1928.

**Gadsden.** A city of Alabama, U.S.A., the co. seat of Etowah co. It stands on the Coosa river, 65 m. N.E. of Birmingham, and is served by the Southern and other rlys. Gadsden is situated in a coal and iron region and in the centre of farming land producing cotton, maize, grain, and poultry. Lumber, red clay, and limestone are found in the vicinity. The city makes iron and steel products, stoves, pipes, furniture, bricks, and textiles. Pop. (1950) 55,725.

**Gadsden Purchase.** THE Transaction by which, for the sum of \$10,000,000 (then about £2,000,000), the U.S.A. obtained from Mexico the strip of territory some 45,500 sq. m. in extent in the Mesilla valley, S. of Gila r., which forms the southern part of the states of Arizona and New Mexico. The sale, negotiated by James Gadsden (1788–1858), was embodied in a treaty signed 1853, ratified 1854.

**Gad's Hill.** Village of Kent, England, famous as the residence of Charles Dickens. It is 2 m. N.W. of Rochester, on the road to Gravesend. The home of the novelist was Gad's Hill Place (see Dickens *illus.*), a red brick house almost opposite the Sir John Falstaff inn. Shakespeare (*I Henry IV*) places the episode in which Falstaff robs the travellers and is then robbed by Prince Hal and Poins at Gadshill, the

name also of a character in the same play.

**Gadwall** (*Anas strepera*). Species of duck native to many parts of Europe, Asia, Africa, and North America. It is rare in Great Britain, except in Norfolk, where it is protected, and breeds in fair numbers. It resembles the common mallard.

**Gaea** OR **GE.** In Greek mythology, the earth goddess. The daughter of Uranus (Heaven), and Pontus (Sea), and by the former of the Titans. She represented the productive power of earth, bringing forth from her bosom and nourishing all living things. Her Roman counterpart, Tellus, was associated with a male divinity, Tellumo.

**Gaekwar** OR **GAEKWAD.** Family name of the princely house which ruled Baroda, India, from the early part of the 18th century until 1949, when Baroda was merged in Bombay. The name, derived from a Hindu word meaning cow, was sometimes used as though it were a title.

**Gael.** Name applied to the members of the Gaelic branch of the Celtic people, and especially to the Celtic people of the Scottish Highlands. The word in Gaelic itself is Gaidheal (*prom.* approximately gale), and in an earlier form was Goidel; contrary to old belief, it is unconnected with Gaul, or Lat. Galli, Gauls.

## GAELIC LANGUAGE & LITERATURE

Magnus MacLean, Author of *The Literature of the Celts*

Consult also articles on languages akin to Gaelic, e.g. Breton; Gaulish, and under Ireland, Isle of Man, etc. See also Celt

Gaelic, the language of the Gael, belongs to the European branch of the Indo-European family. Philology classifies the languages of the European branch into: (1) Greek, Latin, and Celtic in the middle and S. of Europe; (2) English, German, and Norse in the N.; and (3) Russian and Old Prussian in the E. In Greek and Roman times the Celts occupied the middle of Europe and their language has closer affinities with Greek and Latin than with English, German, or Norse.

Celtic itself now stands as the name for two groups of dialects distinct from each other, but closely related—the Gadelic and Brythonic, Gadelic comprising Irish, Manx, and Scottish Gaelic; Brythonic comprising Welsh, Cornish, and Breton. They are also known as the Q and P groups in accordance with a well-marked lin-

guistic distinction which differentiates them. Though Irish, Manx, and Scottish Gaelic are all derived from the ancient Gaelic, the original Gaelic is almost exclusively restricted to the Gaelic spoken in the Scottish Highlands.

For three centuries, from the 5th onwards, the language and literature of Gaelic Ireland and Gaelic Scotland were virtually the same. The Gaels had come from Ireland into Scotland. But after the Norsemen began their raids intercourse between the two countries was interrupted, and this in time, under Pictish and Norse influences, led to a divergence in the speech—a process which the Reformation accentuated, so that Irish and Gaelic became separate dialects.

The beginnings of Gaelic literature date back to the 5th century A.D. But even before then, in pagan times, there existed the materials



the centre of considerable trade, coasting, and fishing. Near it was the Formian villa of Cicero, and tradition points to the spot where he was murdered.

On the fall of the Roman Empire Gaeta became an independent centre of culture and commerce. It held out against the Austrians in 1815 and 1821, and afforded an asylum to Pope Pius IX in 1848-49. The last Bourbon king of Naples was besieged here and forced to surrender to Victor Emmanuel. 1861. Pop. (1951) 19,074.

**Gafencu**, GRÉGOIRE (1892-1957). Rumanian journalist and politician. After study in Geneva and Paris, he joined the Peasants' party in his own country and founded a weekly paper which became the economic daily, *Argus*; a news agency; and a broadcasting station. He was made secretary to the foreign office, 1928. English on his mother's side and multilingual. Gafencu was chosen foreign minister in the crisis of 1938 and made a tour of the European capitals hoping to secure peace—the subject of his book *Les Derniers Jours de l'Europe*, 1946. He resigned in May, 1940, when Rumania was forced into the Nazi alliance; and in 1941 went into exile in Switzerland. He died in Paris, Jan. 30, 1957.

**Gaff** (Fr. *gaffe*). A spar which stretches out the upper end of a sail. The forked part of the gaff which fits upon the mast is called the jaws. At the back of the mast these jaws are joined by a parrel, a cord or rope with balls of wood upon it, so that the jaws slide up and down the mast easily. The other end of the gaff is termed the peak, and the sail is attached to it by halyards. Sails with which a gaff is used are gaff sails.

**Gaff**. Stick armed with an iron hook for landing large fish, especially salmon. The use of the gaff is prohibited for catching salmon unless it is auxiliary to angling with rod and line. See Bone Implements illus.

**Gage**, VISCOUNT. Irish title borne since 1720 by an English family, earlier members of which included Sir John Gage (c. 1479-1556), victorious against the Scots at Solway Moss, 1542; and Joseph (c. 1678-1754), who became a Spanish general and offered large sums in the hope of becoming king of Poland and (later) Sardinia. Joseph's elder brother Thomas became 1st viscount.

**Gage**, THOMAS (1721-87). British soldier and administrator, younger son of the first Viscount

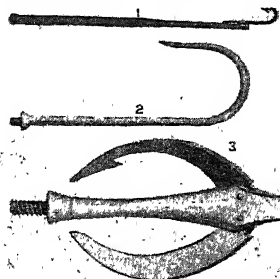


Thomas Gage,  
British soldier

in 1774 of Massachusetts. Here he lacked tact in dealing with the admittedly difficult situation which led to the collision between his troops and the colonists at Lexington on April 18, 1775. This was followed by the battle of Bunker's Hill on June 17, and though Gage was appointed commander of the forces in America in Aug., he shortly afterwards resigned and returned to England. He died April 2, 1787. His Correspondence with the Secretaries of State, 1763-75, was ed. by C. E. Carter, 1931.

**Gahn**, JOHAN GOTTLIEB (1745-1818). Swedish mineralogist and chemist. As a boy he worked in the mines of Helsingland, but having educated himself he was eventually appointed assessor at the Swedish college of mines. He then became analyst and mineralogist at the Gripsholm mines where, in 1774, he discovered a new metal, manganese. The rare mineral gahnite (*v.i.*) was named in his honour.

**Gahnite**. A member of the spinel group of minerals, composed of zinc and aluminium oxides ( $ZnAl_2O_4$ ). It may be associated with other zinc materials in ore deposits, also as a contact mineral or in certain crystalline schists. See Spinel.



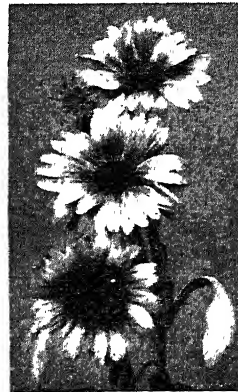
Gaff : angling implement. 1. With handle. 2. For trout. 3. Folding gaff  
By courtesy of N. Allcock & Co

Gage. Entering the army in 1741, he distinguished himself in Braddock's expedition against Fort Duquesne, 1755. In 1760 he became governor of Montreal, and

**Gaiety Theatre**. London theatre at the corner of the Strand and W. Aldwych. The original building was an enlargement of the Strand Music Hall, opened Dec. 21, 1868, under the management of John Hollingshead with *On the Cards*, by Burnand, and *Robert the Devil*, a burlesque by Gilbert. In the 'eighties and 'nineties the old Gaiety was famous as the home of burlesque, with Nellie Farren, Edward Terry, and Fred Leslie as brilliant stars, and chorus girls of legendary charm. It was demolished to make room for the Strand improvements.

Rebuilt from designs by Norman Shaw, the Gaiety reopened with *The Orchid*, Oct. 26, 1903. Under George Edwardes's control it was devoted almost exclusively to musical comedy, e.g. *The Girls of Gottenburg*, *Our Miss Gibbs*, *The Sunshine Girl*. The theatre was acquired in 1920 by Grossmith and Laurillard. In the 1930s it housed musical comedies starring Stanley Lupino and Leslie Henson. Closed from Feb., 1939, a licence being

refused until overhauling was carried out, it was purchased for £200,000 in 1946 by Lupino Lane. Unable to secure permits for repairs, he was forced to re-sell the property in 1951, realising only £133,000. It was bought by the English Electric Company, Ltd., who in 1954 held a competition for a plan of an office building to be erected on the site. Demolition and reconstruction began in 1957.



Gaillardia. Brilliant flowers of this garden plant

**Gaillardia**. Genus of annual and perennial herbs of the family Compositae, natives of America. The leaves are lance-shaped and rough, the flower heads yellow or red.

**Gaine**. A component of high-explosive filling, also commonly known as the booster or exploder. It is introduced between the detonator and the high explosive charge to ensure satisfactory detonation of the main charge. In British service ammunition, bombs, and mines, a small pressed pellet or block of tetryl is normally used as the gaine. See Ammunition: Explosives; Shell.

**Gainesville**. City of Florida, U.S.A., the co. seat of Alachua co. A winter resort and busy rly. junction, it is 80 m. S.W. of Jackson-

ville. Gainesville ships citrus fruits, farm and garden produce, lumber, naval stores, and tung oil, of which industry it is the centre. It is the site of the university of Florida, Florida agricultural college, and a state agricultural experimental station. Established as a trading post in 1830. Gainesville was incorporated in 1869, and received a city charter in 1907. Pop. (1950) 26,861.

**Gainford, JOSEPH ALBERT PEASE, 1ST BARON (1860-1943).** English politician. He was born at Darlington, Jan. 17, 1860, younger son of Sir Joseph Pease, and educated at Tottenham and Trinity College, Cambridge. Pease entered parliament as Liberal M.P. for Tyneside in 1892, later representing Saffron Walden, 1901-10, and Rotherham, 1910-16. He was chancellor of the duchy of Lancaster, 1910-11; president of the Board of Education, 1911-15; postmaster-general, 1916; first chairman of the B.B.C., 1922-26. Interested in colliery and public utility companies, he was chairman of the F.B.I., 1927-28. He was created a baron in 1916 and died Feb. 15, 1943, his son Joseph (b. 1889) succeeding to the title.

**Gainsborough.** Urban dist., market town, and river port of Lincolnshire, England. It stands on the Trent, 18 m. N.W. of Lincoln, and has a railway station. The parish church of All Saints has a 12th century tower, and the Old Hall or manor-house is a picturesque 15th century building, restored in 1884.

Gainsborough is the St. Ogg's of George Eliot's Mill on the Floss. The industries include ironfounding and the manufacture of linseed oil, and a considerable inland trade is carried on by means of the canals connecting with the Trent. The council owns the gas and water supplies, and

maintains baths, library, recreation grounds, markets, and corn exchange. Gainsborough gives its name to a co. div. returning one M.P. Market days, Tues. and Sat. Pop. (1951) 17,509.

**Gainsborough, THOMAS (1727-88).** An English painter. Born at Sudbury, Suffolk, son of a wool merchant, and baptized May 14, 1727, he was sent to London at the age of 13 and studied under Gravelot and Hayman, but failed to make a living by his brush. In 1746 he married Margaret Burr, who possessed an annuity which enabled the young couple to settle in Ipswich.

Here he found patrons and pupils and made the acquaintance of Thicknesse, the governor of Landguard Fort, who advised him to go to Bath to try his fortune. Gainsborough set up there in 1760, and his portraits attracted attention. On the foundation of the Royal Academy he became one of its original members, and in 1774 left Bath for London to reside at Schomberg House in Pall Mall. There his reputation reached its height. His studio was crowded with sitters, and, although he raised his prices several times, he was unable to keep pace with the demands made upon him. He exhibited yearly at the R.A. until 1783, when he quarrelled with the council concerning the position allotted to his portrait group of the princess royal with the princesses Augusta and Elizabeth. He died of cancer of the neck at Schomberg House, Aug. 2, 1788, and was buried in Kew churchyard.

Sir Joshua Reynolds's 14th discourse, delivered to the students of the R.A. on Dec. 10, 1788, was almost entirely concerned with Gainsborough's genius, although the two had quarrelled seriously.

Of his wonderful paintings, more than 200 were portraits—eight of George III, seven of Pitt, five of Garrick.

He also practised etching with some success, and produced a few plates in aquatint. Some of his finest pictures are in the National Gallery, Dulwich Gallery, Windsor Castle, Grosvenor House, Buckingham Palace, National Gallery at Edinburgh, and the Wallace Collection, and many are in private American collections. A man who in spite of his irritability was much beloved, and an accomplished musician, Gainsborough stands in the front rank of English portrait and landscape painters, though he preferred to think of himself first as a landscapist. For exquisite beauty and vibrant quality, his portraits have never been surpassed. Gainsborough's Blue Boy was purchased in 1921 by Henry Huntington of New York for, it was stated, £150,000. In 1928 The Harvest



*Thomas Gainsborough*



Thomas Gainsborough. His portrait of Master Buttall (c. 1770), commonly called The Blue Boy

Waggon was bought for £72,000 by Sir Joseph Duveen at a sale in America.

**Bibliography.** Sketch of Life and Paintings, P. Thicknesse, 1788; Lives, G. W. Fulcher, ed. E. S. Fulcher, 1856; N. D'Anvers, 1897; Lord R. Gower, 1903; Thomas Gainsborough, Sir W. Armstrong, rev. ed., 1905; Thomas Gainsborough, W. T. Whitley, 1915; Lives, E. R. Dibden, 1923; H. Stokes, 1925; M. Woodall 1949.

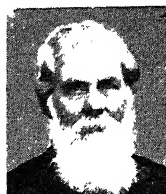
**Gairdner.** Salt-water lake of S. Australia. It lies 360 ft. above sea level, 90 m. S.W. of Lake Torrens. Its length from N. to S. is 160 m., and its maximum breadth 40 m.

**Gairdner, JAMES (1828-1912).** British historian. Born in Edinburgh, March 22, 1828, he entered the Public Record Office in London in 1846, and spent nearly



Gainsborough, Lincolnshire. The Old Hall, manor house built in the 15th century and restored in 1884

his whole life there. He was made a C.B. in 1900, and died Nov. 4, 1912. Gairdner's researches were



James Gairdner,  
British historian  
Russell

mainly concerned with the early Tudor period. He edited the Letters and Papers of the Reign of Henry VIII, vols. 5-21, 1880-1910; and The Paston Letters, 3 vols., 1872-75; while among his writings are Henry VIII, 1889; History of Richard III, 1898; Lollardy and the Reformation in England, 1908-11.

**Gairloch.** Sea loch of Scotland. On the W. coast of Ross and Cromarty, it is 6 m. long and  $3\frac{1}{2}$  m. broad at the entrance. The name is also borne by a village at the head of the loch, which has a pier at which steamers call, and gold links. Pop. 2,781.

**Gaiseric** or **GENSERIC** (c. 395-477). Vandal king. The son of a king, he succeeded on the death of his brother in 428, being doubtless chosen on account of his reputation as a fighter. His people were then in Spain, but he led many of them across to Africa and made his first conquests at the expense of the Romans there. The emperor Valentinian III recognized the new Vandal kingdom, of which Carthage was the capital. Gaiseric then began a career of conquest at sea, capturing Sicily, Sardinia, and Corsica, making his hordes feared by the dwellers along the Medierranean coasts. His greatest exploit was the sack of Rome, 455. His power remained unshaken until his death, Jan. 25, 477.

**Gaisford, THOMAS** (1779-1855). British scholar. Born Dec. 22, 1779, at Iford, Wilts. he was educated at a school near Winchester. In 1797 he entered Christ Church, Oxford, becoming tutor. He was then ordained. In 1812 he was chosen regius professor of Greek, and in 1831 became dean of Christ Church, a post he retained until his death, June 2, 1855. Gaisford made a great reputation as a Greek scholar, and the Gaisford prizes for Greek composition were founded in his honour. He did useful work in connexion with the Oxford University Press.

**Gait.** Term for the manner of walking. The stride and the way in which the foot is brought to the ground are indicative of the personality of the walker. Compare

the mincing, hesitating movements of the nervous with the rhythmic swing of the confident man. Many diseases have a characteristic gait. In cases of neuritis such as are associated with advanced alcoholism, or with acute shortage of Vitamin B, as in pellagra and beri-beri, there is over-high stepage. In paralysis agitans the patient walks bent forward and with rapid steps, as though pursuing his centre of gravity. A dragging gait is associated with chorea. The sufferer from locomotor ataxia walks on a wide base to maintain his unsteady balance.

**Gaitskell, HUGH TODD NAYLOR** (b. 1906). British politician. Born April 9, 1906, he was educated at Winchester and New College, Oxford, where he took 1st class hon.

in philosophy, politics, and economics. After a period in the dept. of political economy at University College, London, he was appointed



Hugh Gaitskell,  
British politician

a reader of London University in the subject. During the Second Great War, he held civil service posts under Hugh Dalton. He had made an unsuccessful bid for parliament as Labour candidate for Chatham in 1935. In 1945 he was elected for S. Leeds. Minister of Fuel and Power 1947-50, and chancellor of the Exchequer 1950-51, he was chosen treasurer of the Labour Party in 1954, leader of the parliamentary Labour Party, and of the Opposition, in 1955.

**Gaius** (fl. 2nd century A.D.). Roman jurist. Except that he lived during the period from Hadrian to Marcus Aurelius nothing is known of him, not even his full name. Fragments of his Institutiones were preserved in Justinian's Digest and other works, and in 1816 the historian Niebuhr discovered, in the library of the chapter house at Verona, a MS. of Jerome, written over an almost complete copy of the work.

**Gala Beds.** In geology, a group of sedimentary rocks, shales, flagstones, grits, etc., of Silurian age. Between 3,000 and 5,000 ft. in thickness, they are developed in the S. of Scotland.

**Galactic Coordinates.** System of specifying the position of heavenly bodies by reference to the Galaxy or Milky Way. Galactic latitude in measured N. or S. from the galactic equator (practically the central line of the Milky Way); galactic longitude along the galactic equator.

**Galactose** ( $C_6H_{12}O_6$ ). Hexose derived from lactose by hydrolysis or by oxidising dulcitol. It may be made by boiling milk-sugar with dilute sulphuric acid, neutralising the solution with baryta, and concentrating by evaporation.

**Galago.** Group of small, longtailed, lemuroid animals, found in most parts of tropical Africa. The largest of them is about the size of a domestic cat, while the smallest is only five inches long.

They are nocturnal in habit, and feed mainly on fruit, insects, and small birds. They are readily distinguished from the true lemurs by their very large ears.

**Galahad.** Knight of Arthur's Round Table, who achieved the vision of the Holy Grail. Son of Lancelot and Elaine, daughter of King Pelles, he was brought up by nuns, came to Camelot on the eve of Pentecost, and received knighthood at Arthur's hand. After riding on many strange adventures, he started, with Sir Perceval and Sir Bors, on the quest of the Sangreal, and was granted the sight of the mystic cup from which Christ drank at the Last Supper. Thereupon Galahad asked for death, and when his hour came, the Sangreal was borne up to heaven and never seen of man again. It was of Galahad that Tennyson wrote: "My strength is as the strength of ten, Because my heart is pure." See Grail; Morte d'Arthur.

**Galápagos** or **TORTOISE ISLANDS.** Group of volcanic islands in the Pacific Ocean, 695 m. W. of Ecuador, to which they belong. Officially renamed the Colon Archipelago in 1892, the 16 islands include Albemarle, Indefatigable, Chatham, James, Hood, Narborough, Barrington, Charles, and Abingdon. Albemarle, by far the largest, is 60 m. long. The archipelago constitutes a territory and its est. area is 2,868 sq. m.

Most of the surface, which rises from 3,000 ft. to 3,600 ft., is arid. Mt. Wilson and Mt. Whiton were active volcanoes in 1925. Yet there is a richly endemic flora, and an interesting fauna; turtles of huge



Galago. Specimen of the Maboli galago



size and giant tortoises are found. Domestic animals run free; cotton, figs, oranges, and tobacco plants, introduced by early colonists, are widely distributed. Sulphur exists in large quantities. Salt, hides, and lizard skins are exported. On Charles Island there is a penal settlement. With the consent of the government of Ecuador, U.S. forces used bases on the islands, 1942-46. Pop. est. 1,000.

**Galashiels.** A burgh in the county of Selkirk, Scotland. It stands greyly on Gala Water, near its confluence with the Tweed.



Galashiels arms

33½ m. by railway S. by E. of Edinburgh. The chief seat of the Scottish woollen industry, introduced towards the end of the 16th century, Galashiels has important tweed factories and dyeworks. Near by are Abbotsford and Ashiestiel, residences of Sir Walter Scott. Market day. Wed. Pop. (1951) 12,683.

**Galatea.** In Greek mythology, a sea nymph, one of the daughters of Nereus. She loved the beautiful Sicilian youth Acis (*q.v.*), who was slain by the jealous Cyclops Polyphemus. Galatea herself is the personification of the bright, calm sea.

The name has also been given to a statue endowed with life by the goddess Venus at the prayer of the sculptor Pygmalion.

**Galati** (Ger. Galaz). Town of Rumania, headquarters of a region of the same name. It is situated on an amphitheatre of hills rising on the N. side of the Danube about 10 m. above its junction with the Prut, and nearly 80 m. N.E. of Bukarest. Before the First Great War it was made prosperous by improved navigation of the river by the Danube Commission. One of the best ports on the Danube, it is well served by rlys., makes iron and copper goods, and exports grain and timber. Galati is the seat of an Orthodox bishopric. It was the scene of a defeat of the Russians by the Turks in 1789; was bombarded in 1916 by the Germans and Bulgarians; and was captured from the Germans by the Russians on Aug. 27, 1944. Pop. (est.) 80,500.

**Galatia.** Territory in Asia Minor, comprising part of Phrygia and part of Cappadocia. It was so called from the name of its inhabitants, Galatae, who were Gauls belonging to the expedition which, under Brennus, penetrated into Greece in the 3rd century B.C. These Galatian Gauls were an off-

shoot from the main host who crossed the Hellespont and overran Asia Minor, until checked by Attalus I, king of Pergamum (241-197 B.C.), who compelled them to settle within the limits of the country subsequently known as Galatia. The Galatians became Graecised in culture, but retained their Gallic speech. Under Augustus, Galatia became a Roman province.

**Galatians, EPISTLE TO THE.** One of the four principal Epistles written by S. Paul. Like the Epistle to the Romans, it contains the main points of the Apostle's teaching, together with autobiographical matter, which supplements the biographical statements in the Acts. The Epistle raises some difficult problems. The most difficult is the question of its destination. Galatia was used in ancient times to denote both a N. district of Asia Minor and also a S. district, the latter being the Roman province.

The N.T. does not mention any missionary work undertaken in the N. district. Hence some scholars adopt what is called the North Galatian theory, others what is known as the South Galatian theory. The latter has the support of Sir W. Ramsay, and it is more natural to suppose that the Epistle was addressed to the Church in S. Galatia. If this theory is adopted, the Epistle may have been written from the Syrian Antioch about A.D. 53. See Paul, Saint.

**Galatina.** Town of Italy, in the prov. of Lecce. It is 15 m. by rly. S. of Lecce. It has a fine 14th century church, with sculptures and tombs, besides frescoes by Francesco d'Arezzo. There is trade in oil, wine, leather, and cotton. Pop. (1951) 23,579.

**Gala Water.** River of Scotland. It rises among the Moorfoot Hills in Midlothian, and flows through Selkirkshire and Roxburghshire, joining the Tweed, 1 m. below Galashiels. Length, 21 m. The valley was once known as Wedale.

**Galaxy** (Gr. *galaxias*, milky). The Milky Way, an irregular luminous belt, composed of faint stars, which crosses the heavens almost in a great circle several degrees wide inclined at 63° to the equator. Its luminosity comes from innumerable stars so far away as to be indistinguishable except by telescope. The word is also now applied to the whole disk-shaped collection of stars in which the solar system is embedded. When the disk is seen edgewise from within, the impression of a luminous band is created. By a

further extension of meaning the word is used for other such systems of stars outside our own Galaxy. See Nebula.

**Galba, SERVIUS SULPICIUS** (3 B.C.-A.D. 69). Roman emperor. He was born Dec. 24, 3 B.C. He



Servius Galba, Roman emperor  
From a bust

had held several provincial governorships with credit, when, in June, 68, he was proclaimed emperor by the legions in Gaul, who had risen against Nero. He proceeded to Rome, but his reign lasted only some seven months. Harshness and parsimony making him exceedingly unpopular, as a result of a conspiracy he was murdered by the soldiery.

**Galbanum.** Gum resin obtained from *Ferula galbaniflua* and probably other large umbelliferous plants growing in Persia. It occurs in tears, in small masses, and in lump form, and is regularly imported into the London market. It possesses a characteristic, aromatic odour and bitter taste. Galbanum has been an article of commerce from early times, and was regarded by the ancients as a stimulant, expectorant, and antispasmodic drug. It is now used occasionally as a stimulant in plasters for external use.

**Galcha** (Persian, boor). Name denoting several mountain tribes in the Pamir and Hindu Kush region in Afghanistan and Tadzhik S.S.R. The best known are the Shighni and Wakhii near Badakshan. They represent the easternmost extension of the round-headed, Alpine people occupying the mountain axis westward to the Pyrenees. Tall, blond, red-haired, grey-eyed individuals show that there is an admixture of a Nordic strain. Living in patriarchal communities, with no intertribal cohesion, they speak Iranian dialects. See Iskasmii.

**Galdhøppigen.** Highest mountain of Norway. In Oppland co., having a height of 8,399 ft., the mt. is part of the Langfjeld plateau, which virtually comprises the S. part of the country.

**Galdós, BENITO PÉREZ.** This Spanish novelist and dramatist is more correctly described as Pérez Galdós (*q.v.*).

**Gale.** To the layman a gale signifies merely a high wind, but the meteorologist requires a more rigid definition. It is the practice

to limit the term to those occasions when the wind velocity exceeds a specified force on a numerical scale—Beaufort scale (*q.v.*). By international agreement ranges of wind velocity, measured by well exposed anemometers, have been adopted as equivalent to Beaufort numbers estimated by experienced observers.

In the lower layers of the atmosphere, however, a reduction in wind speed is brought about by friction with objects on the ground, and for comparisons it is necessary to measure the wind under standard conditions of exposure. The standard adopted in the British Meteorological Office is that the anemometer head should be exposed in an open situation at a height of 10 metres (33 ft.). If anemometers have to be erected at higher levels, corrections will be applied.

Gales are deemed to begin at Force 8 on the Beaufort scale.

the sheltering effect afforded by headlands. In general, Dec. and Jan. are the windiest months in the British Isles. An analysis of gales logged chiefly by lighthouse keepers, coastguards, and crews of lightships during 1876–1935 revealed that on the N. and W. seaboard a gale could be expected every five or six days in these months. Throughout the year as a whole, the N.W. coast of Ireland is the stormiest region with gales on nearly 40 days on the average. The Bristol Channel, S.W. Ireland, S.W. England, and N.W. Scotland record gales on more than 30 days. Excluding the interior, gales are fewer on the E. coasts of England and Scotland, where the number of days each year drops to 20.

Statistics of gales are based on the mean speed of the wind, *i.e.* the average of the gusts and the lulls. Surface irregularities, buildings, trees, etc., set up eddies in the air flow and a gusty wind results.

former. Gusts of at least 100 m.p.h. have been registered on about a dozen occasions in the U.K. since 1909. On Dec. 6, 1929, at Scilly, a gust of 111 m.p.h. was experienced; on Jan. 18, 1945, the speed in a gust at St. Ann's Head, Pembrokeshire, was 113 m.p.h., the highest recorded in the British Isles. It is rare that gusts exceeding 70 m.p.h. are recorded in the London area. Outside the British Isles gust levels reaching 200 m.p.h. may be encountered in revolving storms. In April, 1892, a gust of 130 m.p.h. was registered in a cyclone at Mauritius before the anemometer was blown away. *See* Cyclone; Hurricane; Tornado; Typhoon; Wind.

**GALE WARNING.** Prediction of strong winds as a danger to shipping is one of the most important duties of the forecaster. When an atmospheric disturbance is moving or developing in such a way that it is probable a gale will occur, the Meteorological Office issues warnings which are broadcast or telegraphed to responsible authorities at ports and fishing stations. On receipt of a gale warning a black-painted cone is hoisted by day; at certain places at night the warning takes the form of three red lanterns suspended in a triangle. Storm signals are hoisted when a gale is expected within 50–100 m. of the point where the signal is displayed. This service was introduced c. 1860 by the Board of Trade, at the suggestion of Admiral Fitzroy.

**Gale, NORMAN ROWLAND** (1862–1942). British poet, born at Kew. He was noted for dainty lyrics on birds and flowers, spirited cricketing songs, and charming verses addressed to children. His volumes include *A Country Muse*, 1892; *Orchard Songs*, 1893; *Songs for Little People*, 1896; *Verses in Bloom*, 1925; *Messrs. Bat and Ball*, 1930. He died Oct. 7, 1942.

**Galen or CLAUDIUS GALENUS** (c. A.D. 130–200). Greek physician and writer on medical philosophy.

Born at Pergamum, Asia Minor, he studied at the chief seminaries of Greece and Egypt, and about 164 went to Rome, where he became famous, many eminent Roman physicians attending his lectures. His reputation was still further increased through his wonderful cures, many



**Claudius Galen, Greek physician**  
*From a bust in the Coll. of Physicians, London*

Force 12 is regarded as a hurricane. The wind speed and characteristics of gales of each force from 8 to 12 are shown in the accompanying table. In 1944 an extension of the table for use in countries of the British Commonwealth carried the numbers up to 17.

The highest wind velocities are experienced over the sea and at the coasts, since a wind blowing from sea to land suffers a decrease in force owing to the friction which occurs, particularly in passing over wooded and built-up areas. Comparison is also rendered difficult by

Thus, despite the mean speeds being greater at the coast than inland, the inland stations are more subject to gusty winds than the

Extension of Table, 1944

Beaufort No.	VELOCITY AT 33 FT.	
	Knots	M.P.H.
13	72–80	83–92
14	81–89	93–103
15	90–99	104–114
16	100–108	115–125
17	109–118	126–136

attributed to magic by the superstition of the times. He was intimate with Marcus Aurelius, and body physician to his son Commodus during the emperor's absence on the Danubian campaign.

Galen was the author of some 500 treatises on medical and philosophical subjects. Most of these were burnt in the Temple of Peace in Rome, where they had been deposited, but 83 authentic works are extant. The date and place of his death are uncertain, some authorities saying it took place in Sicily about 200, others at Pergamum some years later. As a physician Galen ranks second only to Hippocrates; he was great as a practical anatomist, but as a physiologist erred on the side of theory. He coordinated all known medical knowledge, and did more than any other single man to render possible the development of modern medicine. *Consult* Harvey and Galen, J. Payne, 1897.

**Galena** OR LEAD GLANCE. The most important ore mineral of lead and frequently silver (argentiferous galena). Theoretically, lead sulphide (PbS) containing 86.5 p.c. of lead; often with silver, sometimes selenium, zinc, cadmium, antimony, bismuth, and copper as sulphides, and occasionally a little gold. Galena crystallises in isometric lead-grey metallic crystals associated with zinc and copper sulpho-salts, silver ores, quartz, carbonates, barytes, fluorite, etc. Cerussite and anglesite are common secondary minerals. It is found in crystalline and non-crystalline rocks. Important ore deposits occur as veins associated with eruptive rocks and as replacements in limestones, in Australia, America, Europe, and elsewhere. The mineral has been worked in Northern England, Cornwall, and Devon. *See* Lead Ores.

**Galenicals.** Preparations of natural drugs. The term is derived from Galen and is now employed to distinguish such preparations as tinctures, extracts, infusions, etc., from drugs obtained by more elaborate chemical procedures.

**Galeopithecus.** Generic name for the flying lemur (*q.v.*). Natives of Malaya and the Philippines, they eat leaves and fruit.

**Galerites** (Lat. *galeru*, a cap). Sea urchins of the Cretaceous system, with conical shaped shells, which give them the popular name of sugar-loaves. The under surface is flat, with a central mouth.

**Galerius, VALERIUS MAXIMINUS** (d. 311). Roman emperor A.D. 305-307, sometimes called

Maximinus. At the quadripartite division of the empire by Diocletian in 293, Galerius became one of the Caesars or junior rulers, with control of the Danube provinces and the Balkans from Sirmium, and on the abdication of Diocletian in 305 he became senior emperor. He relinquished power to Licinius in 307.

**Galesburg.** A city of Illinois, U.S.A., the co. seat of Knox co. It is 43 m. E.N.E. of Burlington, and is served by the Chicago, Burlington, and Quincy, and the Atchison, Topeka, and Santa Fé rlys., and has an airport. It is a rly. and manufacturing centre and shipping point, and produces refrigerators and air-conditioning units, fabricated steel, building and paving brick. The water supply comes from two artificial lakes. One of the Lincoln-Douglas debates of 1858 was held in Knox College here. Galesburg was settled in 1836, and chartered as a city in 1857. Pop. (1950) 31,425.

**Galgacus** OR CALGACUS. Caledonian chief. He commanded the northern native tribes when Caledonia was invaded by Agricola (*q.v.*), and after a determined resistance was defeated about A.D. 85 at the battle of Mons Graupius, from which the Grampians were given their name in the 16th century. The site of the battle is unknown. Tacitus put into the mouth of Galgacus the words "they make a wilderness and call it peace."

**Galicia.** Former kingdom and prov. of N.W. Spain, now divided into the provs. of Corunna, Lugo, Pontevedra, and Orense. It lies between the Bay of Biscay, the Atlantic, and Portugal, with deeply indented coast-line, and is traversed by mts. and watered by the Minho and many smaller streams. The Galician people (Gallegos), a rude, industrious race, retain their individuality. The coastal climate is mild and equable, the rainfall abundant, and the soil is productive. A Roman colony, a Suevian kingdom, a Moorish possession, a part of Castile or Leon, Galicia has shared fully in the history of the peninsula.

**Galicia** (Uk. Halichina). Area of Central Europe. Galicia (a name derived from Halicz, *q.v.*) extends for some 300 m. along the N. side of the Carpathian Mts., from the common frontier of Poland and Czechoslovakia in the neighbourhood of Teschen to the frontier of Rumania between the Dniester and the Carpathians. The N. boundary of the district begins in the W. on the N. side of the

Vistula, then follows the river itself for over 100 m., passes up the valley of the San to the E. of that stream, crosses the Bug to Brody, and finally follows the Zbrucz affluent to the Dniester.

The S. half of Galicia comprises the foothills of the Carpathians, mainly composed of flysch sandstones. The heights stretch in long, monotonous ridges from E. to W., except where the granitic Tatra Mts. present rugged Alpine peaks. The whole area is a natural forest region, coniferous trees being common on the higher ground. The deeply cut valleys contain fertile alluvium. The Jablunkov (1,810 ft.), Lupkov (1,916 ft.), Dukla (1,650 ft.), and Uzsok (2,916 ft.) are the chief passes from Poland to Czechoslovakia. The Magyar or Tatar Gate (3,300 ft.), also known as the Delatyn or Jablonitz pass in the Forest Carpathians, is strategically the gateway from Russia to the Hungarian plain.

The foothills contain deposits of salt and petroleum. The great salt mines of Wieliczka, near Cracow, have been worked for centuries, and the galleries extend for 3 m., 1,000 ft. below ground. Rich deposits of salt are also worked at Bochnia, Sambor, Drohobycz, and Dolina. Drohobycz is the chief centre of the oil district.

#### The Lowland Areas

The N. portion of Galicia comprises three lowland areas: in the W. the narrow valley of the Vistula; in the middle the Galician plain between the Vistula and its affluent the San; in the E. the lowland between Podolia and the Carpathians. The Galician plain is trenced by broad alluvium-filled valleys made during the Ice Age in which the modern rivers, all too small for the valleys, flow unconformably. Between the valleys the plateaux rise from 50 ft. to 150 ft. above valley level; they are covered with glacial deposits of sand and clay, with many erratic boulders. The forest covering has been cut down; sand has encroached over the area and destroyed its former fertility. In the N. there are sand dunes. The rivers flood regularly, and prevent the fertile valley alluvium from being well tilled.

The E. lowland is divided into two parts by the water parting, which passes from W. to E. close to Lvov, between the Baltic and the Black Sea drainage. Northwards drains the Bug, one of the chief tributaries of the Vistula; southwards the Dniester and its

main affluent, the Seret, and the Prut drain to the Black Sea. The N. portion is level and monotonous, with pinewoods, peat bogs, and sand dunes. In the S. portion the rivers have cut deep trenches filled with alluvium; the spring floods frequently turn the valleys into temporary lakes.

#### Population and Political Boundaries

Galicia is more densely peopled than the rest of Poland to the N., or the former Hungarian area to the S. The inhabitants in the W. are Roman Catholic Poles, and in the E. Greek Orthodox Ruthenes or Little Russians. Historically, this boundary zone has marked the E. limit of the influence of the Roman Church since A.D. 1000. All Galicia was included within the kingdom of Poland during the 14th, 15th, and 16th centuries. In 1740 it was divided, the W. belonging to the district of Little Poland and the E. to Red Russia. Galicia became Austrian in 1772. That part W. of the San went to Poland after the First Great War, as did East Galicia in 1921. Following the Second Great War, a Russo-Polish treaty of Aug., 1945, gave Galicia E. of Przemysl to the U.S.S.R.

**BATTLES IN GALICIA.** Early in the First Great War the Russians attempted to break through to Germany via Bohemia, which necessitated an advance through Galicia. They took Lemberg (Lvov) and Tarnopol, but were halted at the Carpathians by Austro-Hungarian forces. In spring, 1915, the Germans, under von Mackensen, broke through the Gorlice Pass and forced the Russians to retreat. Przemysl was relieved at the beginning of June, and Lvov towards the end. The Russian forces, reorganized, undertook an offensive in Sept., defeating the Austrians S.E. of Lvov. Trench warfare supervened until the autumn of 1916, when the Russians made another attack that was brought to a standstill by their revolution of 1917.

When German armies invaded Poland on Sept. 1, 1939, resistance was stubborn in the S., where to meet three German armies there were only two Polish. Coordinated withdrawal was impossible, because the Polish left was continually outflanked by German forces which had crossed the Carpathians from Slovakia. It was hoped to establish

defensive fronts on the Vistula and other rivers, but a German thrust towards Lvov, in conjunction with another from E. Prussia, rendered this impracticable. On Sept. 17, Russian troops advancing into Galicia occupied Lvov, Tarnopol, and Przemysl. The line of demarcation between the Russian and German zones of occupation in Galicia was the San.

When Germany attacked Russia on June 22, 1941, Russian forces in Galicia were forced to withdraw evacuating the district by the first week in July. For the campaign of 1944-45, see Russo-German campaigns.

By Jan. 19, 1945, Russian armies had cleared Galicia and liberated Cracow. Under the terms of the treaty signed Aug. 17, delimiting the Russo-Polish frontier, Galicia E. of the San passed to Russia, who gained possession of valuable oilfields.

**Galignani, GIOVANNI ANTONIO** (1752-1821). Founder of a celebrated family of European publishers. Born in Brescia, he settled in Paris and established an English library there in 1800. In 1814 he began the publication of *Galignani's Messenger*, carried on by his descendants until 1884, when they disposed of the paper.



Galilee. Map of the province in New Testament times

which, until it ceased in 1904, was called *The Daily Messenger*.

**Galilee.** Dist. of N. Palestine. Little is recorded of it in O.T. days, but after the Captivity it was ceded by the Assyrians to the Israelites and soon became virtually a separate nation, the inhabitants being chiefly Arabs, Syrians, and Greeks. They were despised by the Jews of the S., and the fact that Christ's home was in that country was made a reproach to Him. Tiberias was its chief city, and it was a fertile and populous district, but is now little better than a wilderness in many parts.

**Galilee, SEA OF.** Lake in Palestine, also called the lake of Tiberias and the lake of Genesareth. It is formed by an expansion of the Jordan, about 13 m. long by 8 m. broad. Owing to its situation among steep hills it is subject to sudden and violent storms, to which allusion is made in the Gospels. On its shores stood various cities, including Tiberias and Capernaum, the latter the scene of so much of Christ's ministry that it was known as His own city. Of these cities only Tiberias remains, the sites of the others having been covered up.

**Galilee.** Term in ecclesiastical architecture. Its origin is obscure.



Galilee, looking across the sea towards Tiberias

It is applied to a chapel at the west end of Durham cathedral, and also to large porches such as those to be seen at Ely cathedral and Lincoln cathedral.

**Galileo Galilei** (1564–1642). Italian astronomer. Born at Pisa, Feb. 15, 1564, he was the son of a



*Galileo Galilei*  
From a picture in  
Tim. Coll., Camb.

Florentine nobleman, who intended him to adopt medicine as a profession. He entered Pisa University in 1581, but there he soon followed his natural inclinations, and while still only 25 he became professor of

mathematics, working on dynamics during 1589–91.

Early distinguished by clarity and originality of thought, he won by his free expressions of opinion such unpopularity that he had to resign. In 1592 he went as professor of mathematics to Padua, where he made a series of scientific discoveries. A report from Flanders in 1609 of the invention, by Hans Lippershey, of a glass which made remote objects appear near led to his constructing a telescope, and its first application to astronomical observation.

This marked a revolution in astronomy, and Galileo's first observations were published in *Sidereus Nuncius*, 1610. Specially notable was his discovery of the satellites of Jupiter, confirming the planetary theory of Copernicus (*q.v.*). In that year Galileo moved to Florence, as mathematician to the duke of Tuscany, and observed sunspots and the formation of Saturn. During 1613–15 he was engaged in controversy on the theological implications of his discoveries, and of the Copernican theory, which resulted in his being warned by the Holy Office, in Feb., 1616, not to spread the Copernican theory.

In 1632 appeared his great work, *Dialogo sopra i due massimi sistemi del mondo* (dialogue on the two greatest systems of the world), and the controversy re-opened, for scientists hailed the conclusions as loudly as churchmen condemned them.

Summoned to Rome, Galileo, under the threat of torture, June 22, 1633, recanted the doctrine that the earth moved round the sun. He returned to Florence, where he spent his remaining years. One of his last notions was that a

pendulum might be applied to regulate a clock. Probably his contributions to mechanics are Galileo's chief claim to fame. He went blind in 1637, and died Jan. 8, 1642.

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**Galitzin.** Name of a Russian noble family. Vasili Galitzin (*v.i.*) was its first prominent member, and after him came two brothers, Mikhail and Dmitri. Mikhail (1674–1730) was a soldier who assisted Peter the Great in his wars with Sweden; Dmitri (d. 1738) was one of those who helped Anne to secure the throne in 1730; but in 1731 he was banished, and he died in prison. Later members included Dmitri Alexeivich (1738–1803), ambassador to France and to the Netherlands, also a writer on scientific subjects, the husband of Princess Galitzin (*v.i.*) and the correspondent of Voltaire.

**Galitzin, ADELHEID AMALIE, PRINCESS** (1748–1806). German pietist. The daughter of a Prussian general, she was born at Berlin, Aug. 28, 1748, and married Dmitri Galitzin, Russian ambassador to France and the Netherlands. Of literary tastes and an extraordinarily amiable disposition, she became noted for her piety. She established a circle of pietists in Münster. She died Aug. 24, 1806.

**Galitzin, VASIL VASILIEVICH** (1643–1713). Russian statesman. In 1676 he was successful in a campaign against the Dnieper Cossacks and in 1682 became minister of foreign affairs. Regent during the minority of Peter the Great, he wielded great influence and ruled Russia with a firm but just hand. He led two expeditions into the Crimea. In 1689 the regency ended, and Galitzin was sent into exile, dying in Siberia, March 13, 1713.

**Galium.** Genus of hardy annual and perennial plants belonging to the family Rubiaceae. Its common name is bedstraw (*q.v.*).

**Gall.** Word used in different senses according to its etymology. (1) The fluid secreted from the liver, more generally known as bile (Gr. *cholē*, Lat. *fel*). The phrase gall and wormwood is used to express anything specially painful or unpleasant. (2) The gall-nut or oak-apple (Lat. *galla*), a swelling on the oak-tree resulting from the attacks of certain parasitic insects. From

this probably comes the meaning of a soft tumour or sore on a horse's back, the result of rubbing, the verb to gall being used in the sense of to chafe.

The galls on trees and herbs are varied in their nature and origin. Most are abnormal growths which develop around the larvae of insects as these feed and grow within the plant tissues, the eggs having been introduced by the female insects through punctures made for that purpose. Of this class are the familiar oak-apples, bullet-galls, and leaf-spangles of the oak, the nail-galls of the beech and lime, and the cone-like galls on the shoots of spruce. Other galls, such as the "witches' broom" which appears on pine, birch, cherry trees and others, are caused by fungi. See Gall Wasp; Witches' Broom.

**Gall** (c. 550–645). Irish saint. Born in Ireland, he was educated at Bangor under S. Columban. In 585 he went to France, and later to the neighbourhood of Lake Constance, where his preaching converted large numbers to Christianity. In 614 he founded the Benedictine monastery of St. Gall, on the river Steinach, Switzerland, which became a great centre of learning. Offered the bishopric of Constance, 616, he declined. He died at Arbon, Oct. 16, 645.

**Gall, FRANZ JOSEF** (1758–1828). German anatomist and founder of phrenology. Born at Tiefenbrunn,



Franz Josef Gall,  
German anatomist

near Baden, March 9, 1758, he studied medicine at Strasbourg and Vienna. Interested by the possibility of a connexion between the form of the skull and mental growth and characteristics, he gave lectures on this subject in Vienna in 1796. In 1800 Joseph Caspar Spurzheim (1776–1832) became his pupil, and in 1804 his partner in research. They toured Germany and Switzerland lecturing, and came to Paris in 1807. After Spurzheim left France in 1813, Gall continued to work in Paris till his death at Montrouge, Aug. 22, 1828. Among his works are *Introduction au Cours de Physiologie du Cerveau*, 1808; *Anatomie et Physiologie du Système Nerveux*, 1810–19.

**Galla.** Hamitic people of south Abyssinia, north Kenya, and Somaliland. They invaded southern Ethiopia from the west in the 16th

century, and their movements farther east have been affected by those of the Somali. Though some Galla groups (e.g. the Borana) still pursue their traditional nomadic way of life, many have turned to settled agriculture, making use of a primitive plough drawn by camels or oxen. Among the Galla are found the only numerous pagan Hamite group, though they include many Christians and Muslims. Monogamy and patriliney are the rule.

**Gallabat.** Town of the Republic of Sudan. It stands on a tributary of the Atbara, near the Abyssinian frontier. There is considerable trade with Abyssinia, Gallabat forming one of the frontier customs posts. On July 6, 1940, Italians advancing from Abyssinia captured Gallabat, but the British retook it four months later.

**Gallacher, WILLIAM** (b. 1881). Scottish politician. Born at Paisley, Dec. 25, 1881, he started work as a brass turner at the age of 16. He was chairman of the Clyde workers' committee during the First Great War. A member of the executive committee of the Communist party from 1921, he was made president in 1936. As Communist M.P. for West Fife 1935-50 he won a reputation for fiery intervention in debate. His books include *Revolt on the Clyde*, 1936; *The Chosen Few*, 1940; *Marxism and the Working Class*, 1943; *What Is Democracy?*, 1946.

**Galla Ox** OR SANGA. Domesticated breed of humped cattle, found only in Abyssinia and the surrounding country, and kept by local tribes of Gallas. It is remarkable for massive horns, and it may be a descendant of the Indian buffalo.

**Gallarate.** Town of Italy, in the prov. of Varese. It is 25 m. by rly. N.W. of Milan, and a junction for Arona and Varese. It has an 11th-century Romanesque church, a technical school, cotton mills, and many textile factories. Machinery, buttons, and cabinet goods are made. Electric works at Vizzola, 6 m. W., were once reputed to be the largest in the world. Pop. (1931) 29,748.

**Gallas, MATTHIAS** (1584-1647). Austrian soldier. Born Sept. 16, 1584, he began his military career in the Spanish service; when the Thirty Years' War began he entered the service of the Catholic League, and his courage and talent soon carried him to the front. He took command of Wallenstein's army when its leader was mur-

dered, a crime in which he was concerned, and won a great victory at Nördlingen over the Swedes in Aug., 1634. He was dismissed, but was recalled, only to have his army destroyed. Gallas, who became very rich by his plunderings, founded the Austrian family of Clam-Gallas. His titles included those of count of the empire and duke of Lucera. His corpulence gave rise to much ridicule among his enemies. See *Caricature illus.*

**Gallatin, (ABRAHAM ALFONSE) ALBERT** (1761-1849). Swiss-born American politician and diplomat.



*Albert Gallatin*  
After Chappell

Born at Geneva Jan. 29, 1761, he emigrated to America in 1780. In 1789 he entered politics in Pennsylvania, being a member of the Pa. legislature 1790-92; and a moderating influence in the so-called Whisky rebellion of 1794. Elected to the U.S. senate in 1793, he was declared ineligible on the ground that he had not been a citizen for nine years. He served as a representative in congress, 1795-1801, winning fame as an authority on financial matters. This led in 1801 to his appointment as secretary to the treasury, in which capacity he reduced the national debt, and did much to improve the country's financial position. Leaving the treasury in 1814, he was made a commissioner for the treaty of Ghent, 1814. He was minister to France 1816-23, and to Great Britain 1826-27, retiring from public life in 1828. He died at Astoria, Long Island, Aug. 12, 1849.

**Gall-bladder.** Receptacle on the under surface of the liver. In it bile is stored to be discharged at very low pressure into the duodenum, first part of the small intestine, during the process of digestion. See *Gall-stones*.



*Matthias Gallas*,  
Austrian soldier  
From a print

**Galle** OR POINT DE GALLE. Seaport of Ceylon, on the S.W. coast of the island. Until the development of the harbour at Colombo, Galle was a port of note; its harbour has the advantage of deep water close to the land, but it lacks adequate shelter to make it safe in rough weather. It was founded as Ponto Gallo by the Portuguese in 1518. There is rly. communication with Colombo. Pop. (1953) 55,825.

**Galle, JOHANN GOTTFRIED** (1812-1910). German astronomer. He was born near Wittenberg, June 9, 1812, became professor of astronomy and director of the observatory at Breslau in 1851, retired 1897, and died at Potsdam, July 10, 1910. Galle discovered three comets and at Berlin on Sept. 23, 1846, with d'Arrest, was the first to detect the planet Neptune from the calculations of Leverrier.

**Gallegos.** Town of Argentina, in the province of Patagonia. At the estuary of the river Gallegos, it is 1,600 m. S.S.W. of Buenos Aires. It trades in refrigerated mutton, sheepskin, wool, and tallow. It is served by air-line.

**Galleon** (Span. *galeón*). Spanish ship of the 15th, 16th, and 17th centuries. Of large size, sometimes with three or four gun decks, it was used both for war and in the Indies trade. Owing to their cumbersome build, galleons were awkward to handle, and the lighter, quicker craft of the British seamen were able to defeat them by their better manoeuvring powers, as was shown by the episode of the Great Armada in 1588. The name is sometimes used loosely of any large ship. A galleass was a ship of the galleon type but smaller, and partly propelled by oars. It had high castles at stem and stern and was low in the waist, where, chained to cross-benches, sat the 300 galley slaves who rowed the vessel.



*Galleon such as formed part of the Spanish Armada*  
From an old print



**Gallery** (Fr. *galerie*). Upper floor extending over a part only of the room below it. In secular architecture, the use of a gallery may be traced, in Great Britain, to the Norman keep (*q.v.*), the hall of which was often surrounded by a gallery built into the thickness of the wall. Such galleries were lighted by an upper tier of windows. As a domestic feature the gallery did not attain importance till the latter part of the 16th century, when the Elizabethan long gallery was introduced. The earliest example is believed to have been at Hampton Court, built about 1540. From this time designers appear to have aimed at elongating this apartment as much as possible.

When it became the fashion to collect family portraits and other works of art, the gallery was the most suitable place for their accommodation; hence the application of the term to a museum of art treasures. The Elizabethan gallery extended the whole length of the longest wing of the house, and being on the first floor was approached from the hall by the main staircase. It was lighted from both sides and ends, the walls were usually panelled, and the plaster ceiling richly decorated.

The minstrels' gallery (*q.v.*), a well-known feature of the hall of the fortified manor house, arose out of the custom of cutting off the entrance end of the hall from the rest by a screen, the roof of which formed a platform where music could be performed. Church interiors, in the Middle Ages, were often fitted with galleries, the top of the rood screen being frequently used for that purpose. Galleries at the west end and along the aisles of early 17th century churches were common until Archbishop Laud was charged with the duty of abolishing them. Many survived, and the feature was also copied in chapels. The word is also used for a level or drive in a mine, and for the highest tier of seats in a theatre or concert hall.

**Galley** (late Lat. *galea*). Six-oared boat in a warship, used by the captain only. It is the largest single-banked (*i.e.* not having two oars abreast) boat

in the ship. An admiral's boat is called a barge. Large galleys were the earliest form of fighting ship and were so used in the Mediterranean until late in the 16th century. The last great battle between galleys was that of Lepanto, 1571. In modern vessels the place where cooking is done is called the galley.

**Galley**. In printing, a flat tray made of metal or wood used for holding type after it has been set. It is oblong or quarto in size with flanges on each side and at one end. On the quarto galley the type is made up into page form and secured before it is slid off on to the stone. Impressions of the type secured on the oblong galley by means of side-stick and quins are called galley proofs, and the form of press on which the proofs are pulled is known as a galley press. *See* Printing; Type-setting.

**Gall Fly**. This is a common but inaccurate name for the gall wasp (*q.v.*).

**Galliard**. Old dance, of a lively character, in triple time. Some writers have quoted it as being of



Galliard. Opening of melody by John Bull, supposed by some to be the original form of the tune used later for God Save the King

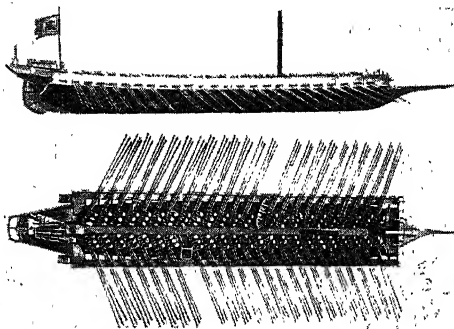
an immodest character, but there is nothing in the music to suggest this. One of the supposed original forms of God Save the King is a galliard by John Bull (1562-1628), of which the melody begins as shown above.

The galliard was usually associated with the pavan, a stately dance in duple time, which it followed in the suites of the 17th century. After about 1640 the galliard, in name, disappeared, and its place was filled by the minuet and saraband, as representatives of

triple time. *See* Minuet; Pavane; Sarabande; Suite.

**Gallic Acid** ( $\text{H}_3\text{C}_7\text{H}_3\text{O}_5\cdot\text{H}_2\text{O}$ ). Substance with an astringent taste. It occurs naturally in small quantities in galls, sumach, and divi divi. It is best prepared by Scheele's method; finely powdered gall-nuts are extracted with cold water and the separated solution is allowed to become mouldy. The fermentation thus set up converts, or hydrolyses, the tannin into gallic acid. It is also prepared by boiling tannin with dilute sulphuric acid. Gallic acid is used in medicine as an astringent, and in photography on account of its power of reducing gold and silver salts.

**Gallican Church** (Lat. *Gallia*, Gaul). National church of France. It arose under Irenaeus towards the close of the 3rd century, took definite shape as a state organization under Charlemagne, and was consolidated by decrees of Louis IX in 1226-70, the controversies between Philip IV and Pope Boniface VIII, and Louis XIV and Pope Innocent XI, the councils of Pisa, Constance, and Basel, and



Galley. Medieval Venetian trireme; the rowers sat in groups of three, the oars of each group passing through the same rowlock-port as seen in this model

From Vincati, "Le Triremi"

the Pragmatic Sanction of 1438. At the instance of Louis XIV its principles were drawn up by Bossuet in a document which maintained that S. Peter's successors had power alone in spiritual things and that papal decisions were valid only with the consent of the whole Church.

This attitude of independence of Rome became known as Gallicanism and had its advocates in other countries. It was opposed by Ultramontaniam, or defence of Roman centralisation; but the Vatican has always regarded it as representing a contest between despotic rulers and corrupt ecclesiastics for church property, patronage, and influence, and by the definition of papal infallibility in 1870 it became a formal heresy.

The Gallican church was abolished at the Revolution of 1789, re-established under Napoleon, who maintained that the pope could not relieve French subjects from loyalty to their secular ruler, and finally severed from the state during the Third Republic. Its specific Gallicanism had become obsolescent before it ceased to be a national church. *See* Bossuet; Concordat; Fénelon; France; Jansenism; Jesuits; Lamennais;

Ultramontane; consult also Church and State in France, A. H. Galton, 1907.

**Galli-Curci, AMELITA** (b. 1890). Italian-born American singer. Born at Milan, Nov. 18, 1890, she became a pianist, graduating at Milan conservatoire in 1903. In 1909 she made her debut as a soprano singer, and soon scored a great success in Italy, Spain, and S. America. By 1916 her reputation as a coloratura was established and she took leading parts with the Chicago Opera Company, joining the Metropolitan Opera company in New York, 1919. She toured England in 1924 and 1930. Her popularity, based upon the extreme flexibility and brilliance of her voice, surmounted what critics termed musical inaccuracies and unequal dramatic interpretation.



A. Galli-Curci,  
Italian-born  
American singer

**Galliéni, JOSEPH SIMON** (1849-1916). French soldier. Born at St. Bât, Haute-Garonne, April 24, 1849, he entered the army in 1870 as lieutenant of marines, taking part in the Franco-Prussian War, and later seeing active service in the Sudan and Indo-China. He was governor of Madagascar, 1896-1905, organized the island as a French colony, and published an account of this work in 1908. That year he became a member of the Conseil Supérieur de Guerre. During the First Great War he was appointed military governor of Paris, Aug. 26, 1914, saw to its fortifications, and rendered assistance to the French 6th army under Gen. Maunoury. He was named the Saviour of Paris, as his plan of sending troops to the front in Paris taxicabs helped to decide the victory of the Marne in Sept. In Oct., 1915, he was minister of war in the cabinet of Briand, but was compelled to resign by ill-health in March, 1916, and died May 27. He was posthumously created a marshal of France in 1921.

**Gallienus, PUBLIUS LICINIUS EGNATIUS**. Roman emperor A.D. 260-268. He was associated with his father, Valerian, in the government from 253, and succeeded him on his disappearance in the disastrous Persian campaign. Vain and frivolous, Gallienus was quite unfitted to rule. A separate "Empire of the Gauls" was created under Postumus, and the prince of

Palmyra, followed by his more famous wife Zenobia, carved what was, in effect, an independent kingdom out of the eastern portion of the empire. Hordes of Goths penetrated the N.E. frontier, while plague materially reduced the population of the empire. Usurpers arose in all parts, and while dealing with one of these, named Aureolus, Gallienus was murdered by his own soldiery.

**Gallinaceous Birds** (Lat. *gallus*, a cock). Name applied to game birds generally. It includes such groups as the pheasants, partridges, quails, and domestic fowls. They are found in practically all parts of the world, and are valued for the table. See Fowl; Grouse; Pheasant; Poultry.

**Gallio**. Roman Proconsul of Achaia in the 1st century A.D. He was a brother of the Stoic philosopher, Seneca. Paul was brought before him at Corinth. Amiable, accomplished, and of mild disposition, Gallio typified Roman impartiality towards the controversies of sects and parties. The phrase "he cared for none of those things" (Acts 18, v. 17) seems to imply this impartiality rather than to indicate hostility or indifference to Paul.

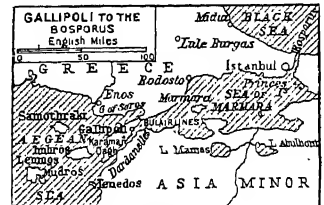
**Galliot** (late Lat. *galeota*, small galley). Type of Dutch trader somewhat akin to the British barge, and now almost obsolete. The galliot was a long, narrow, two-masted craft of about 100 tons burden. She carried a main mast and a mizzen, but the sail on the latter was of small area and used principally to assist in steering the vessel. The mainsail was short at the head and very long at the bottom.

**Gallipoli**. Seaport of European Turkey, in the vilayet of Adrianople (Edirne). Situated at the N.E. end of the Dardanelles, on the peninsula of the same name, it is 130 m. S.W. of Istanbul. It was the ancient Kallipolis, of which some ruins remain. Before the First Great War, it had a considerable trade in wheat, barley, maize, and linseed, produced in the neighbourhood. Its capture by the Turks in 1354 gave them their first foothold in Europe. There are two good harbours, of which the Allies made full use during the Crimean War. The Russians improved the defences in 1878.

**Gallipoli** (Gr. *Kallipolis*, beautiful city). Seaport and city of Italy, in the prov. of Lecce. It stands on the Gulf of Taranto, on an island, protected by a fort and connected by a bridge with the

mainland, 25 m. W. of Otranto. It possesses an Angevin castle, and a cathedral dating from 1629. Formerly famed for its olive oil, stored and clarified in rock-cut cisterns, it exports wine and fruit, but the output of oil has declined. In the vicinity there are stone quarries. Tunny fishing is engaged in. As the "beautiful city" it was founded by Greeks, and in Roman imperial times was known as Anxa. Pop. (1951) 15,505.

**Gallipoli**. Peninsula of Europe, now a part of western Turkey. Anciently known as the Thracian Chersonesus, this tongue of land is 52 m. in length from the isthmus of Bulair in the N. to Cape Helles (Helles Burnu), its S. extremity, and varies in width from 2 m. to 12 m., its broadest part, from Kilid Bahr, on the W. side of the Narrows of the Dardanelles, to Cape Suvla (Suvla Burnu), being measured from S. to N. The isthmus of Bulair is 3 m. across,



Gallipoli. General map of the district

with the Gulf of Saros on the W., and the S.W. end of the Sea of Marmara, above Gallipoli Strait, on the E. The isthmus is strongly fortified by the Bulair Lines.

The E. shore of the peninsula forms the W. side of the Dardanelles, and is of enormous strategical importance. Its W. shore fronts the Gulf of Saros on the N., and the Aegean on the S., opposite the island of Imbros, about 20 m. W. The peninsula is covered with rocky ridges and hills, some of which rise to a height of nearly 1,000 ft. The population is sparse.

The most important place in the peninsula is Kilid Bahr, from its military significance, at the foot of the Pasha Dag, 700 ft. high. Mohammed II, the Conqueror, who took Constantinople in 1453, founded it, and it came to be termed the castle of Europe, just as Chanak opposite it was called the castle of Asia. In the 17th century the Turks constructed fortifications at Sedd-el-Bahr, at the S. end of Gallipoli, and at Kum Kale, on the Asiatic side, at the entrance to the Dardanelles from the Aegean.

## GALLIPOLI: THE CAMPAIGN OF 1915

H. W. Wilson, Joint Editor of The Great War

*The Gallipoli expedition was an Allied venture of the First Great War which ended in failure and gave rise to considerable public controversy. The facts about the origin, conduct, and results of the military campaign are given here. For the preliminary naval operations see Dardanelles. See also Dardanelles Commission*

On Jan. 2, 1915, the Russian government appealed to Great Britain for action against Turkey, in order to relieve the pressure on the Russian army in the Caucasus. A promise was given by the British government that a demonstration would be made, and after much discussion, the point at which it was to take place was fixed by the cabinet as the Dardanelles. This project gradually widened into a campaign for reaching Constantinople and opening the Black Sea, though in January, 1915, the Turkish forces in the Caucasus were beaten and forced back upon the defensive, so that the immediate danger to Russia passed. But the risk remained that she might collapse before the German attack in Poland, owing to the want of munitions, which she could neither manufacture nor import; and if the Black Sea could have been opened her forces could have been increased by some millions, and her artillery could have been provided with shells.

### Plans of Attack

The first intention of the British was to deliver a purely naval attack, but, even before this had opened, it was decided on Feb. 16 that land forces must be available in the area "to be used as occasion might require." This decision committed the British government to some form of military enterprise. Withdrawal was impossible without loss of prestige, Lord Kitchener, then secretary for war, having originally declared no further troops could be spared for the East, now agreed to send the 29th division, still in the U.K., to Gallipoli instead of to France. Later, however, he hesitated again, and for a time allowed himself to be persuaded that the division was needed more urgently in the West. Winston Churchill, first lord of the Admiralty, who had been throughout the prime supporter of the Gallipoli project, pressed for immediate action, but Kitchener did not finally agree to release the 29th division until March 10.

On Feb. 19 the naval attack on the Turkish forts commanding the Dardanelles began and was prosecuted as weather permitted till March 18, with no result to the

Allies but heavy loss in men and ships. The Turks had been given such ample warning that they were ready, and, under the direction of Liman von Sanders, had thoroughly organized their defences. At the outset Venizelos, the Greek prime minister, was willing to join in the campaign, and offered the aid of the Greek fleet and Greek troops. But there was already a secret Allied understanding about Russia's claim to Constantinople, and Russia protested against any suggestion that Greek troops, and particularly the Greek king, should forestall her by entering that city as conquerors. The Greek king, Constantine, sympathetic to Germany through ties of blood, was quick to repudiate the Greek offer and to dismiss Venizelos. A Russian corps was held at Sevastopol ready to strike at Constantinople, but at the end of April it was withdrawn to meet the Austrians in Poland.

On March 12 Sir Ian Hamilton was appointed to command the Allied landing force which was to be held ready. He was promised by Lord Kitchener 80,000 men, of whom about 15,000 would be French. The instructions given by Lord Kitchener were of a casual character. He placed the Turkish force at only 40,000 men; he thought that the southern part of the Gallipoli peninsula, which was reported by those on the spot to be very strongly entrenched and

wired, was "open to a landing on very easy terms"; and he appears at that date to have expected the navy to clear the passage, leaving the expeditionary force only the duty of occupying Constantinople. His instructions forbade operations on the Asiatic coast, which, according to the French ex-military attaché at Constantinople, was the most vulnerable point, and he seems to have been responsible for the plan eventually adopted, of landing at the tip of the mountainous, roadless, and desolate Gallipoli peninsula, and fighting a way over its series of rocky heights, which were covered with thorny scrub, and almost waterless in summer.

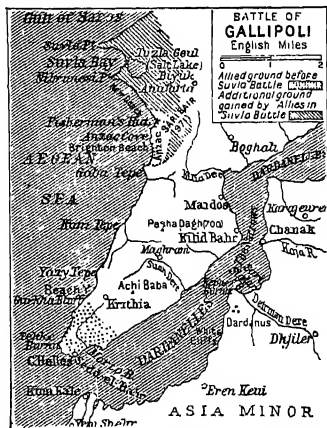
The landing of the expeditionary force could not be carried out promptly, after the failure of the naval attack, as the transports had not been loaded in such a manner as to permit a rapid disembarkation on a hostile coast. Sir Ian Hamilton had no appliances, and his picked regular division, the 29th, had not arrived. He decided to withdraw the transports to Egypt, there to reload them.

### The First Landing

Not till April 23 were they back at the Dardanelles, and on April 25 the landing took place, with a total force of about 90,000 British and French. No attempt was made to seize the Bulair isthmus, the most vital point if Gallipoli was to be secured. Feints were made by the French on the Asiatic coast, and by the British at several other points, but the main landings took place at open beaches on the Gallipoli peninsula. The arbitrarily chosen names of the landing beaches, e.g. V beach (Lancashire landing), X beach (Implacable landing), and Z beach (Anzac Cove), live in military history. The chief landings were in the region of Cape Helles, the extreme southern tip of the peninsula, but Z beach was isolated to the north of Gaba Tepe (see map). By great heroism, and in spite of very heavy losses, under cover of the fire of the fleet, the Allies established themselves ashore.

They found themselves short of artillery and ammunition, and still shorter of water, confronted by a superior Turkish force who were well entrenched, amply supplied with machine guns and artillery, and protected by barbed wire, holding a succession of six parallel ridges.

At the southern tip of the peninsula by May 5 the Allies were less than a mile S. of Krithia, but the



Gallipoli. Map showing the scene of the campaign

British loss to that date had been 13,979, and ammunition was running very low. On May 6 a second French division began to arrive, and the second battle of Krithia opened, but it brought only a trifling advance, purchased with heavy loss. The Australians at Gaba Tepe, lacking land communication with the rest of the Allied force, were violently counter-attacked by the Turks on May 10, and again on May 18-19. These attacks were repulsed, though not without difficulty. The Allies, in fact, were everywhere held in a siege war for which they lacked the necessary ammunition and equipment. The appearance of German submarines at the Dardanelles on May 25 endangered the whole expedition, but, fortunately, the German boats were very timidly used. On June 4 a general attack was delivered on the Turkish defences at Krithia, and was repulsed with severe loss, though on June 21 the French made a small advance. A week later, on June 28, the Australians improved their position, carrying five lines of trenches.

#### Attack on Achi Baba

On July 12 the Allies, who had now been reinforced by a fresh British division, delivered a frontal attack on the Turkish defences at Achi Baba, which was continued on the following day with no result but a small gain of ground and heavy losses. The British government had now, however, reluctantly decided to send out strong reinforcements which would raise the total strength of Sir Ian Hamilton's army to 100,000 effective infantry. These reinforcements were to be employed mainly in a new landing at, and an advance from, Suvla Bay, to turn the Turkish defences in the southern part of the peninsula, and in a vigorous attack from the Australian positions on the Turkish entrenchments about Sari Bair.

On Aug. 6 the Allies attacked in the S. of the peninsula to hold the Turks, and fighting there continued for six days with little result; simultaneously, the advance was begun from the Australian front on Sari Bair; and a landing was successfully effected at Suvla Bay, the Turks there being completely surprised. But at every point the operations miscarried. By Aug. 10 the Suvla attack had completely failed; it was renewed on Aug. 21 without a gleam of success. Before this last attack Sir Ian Hamilton telegraphed a request for 45,000 drafts and 50,000 new formation troops

in addition, which the British government was unable to grant. Lord Kitchener's hope that the Turks would run when British submarines passed up the Dardanelles had proved quite chimerical.

On Oct. 11 the government asked for an estimate of the losses likely to be involved in the evacuation of the peninsula, and when Sir Ian Hamilton replied that "we might have a veritable catastrophe," he was recalled, and replaced by Sir C. C. Monro. Kitchener himself visited the peninsula. The Allied force had fallen to 50,000 fit men; sickness was growing; the daily wastage was nearly 1,000; the enemy was being strongly reinforced, and with the German advance through Serbia there was every probability that at an early date heavy guns would reach the Turks and blow the Allies out of their positions. After great hesitation, on Dec. 8 the British cabinet ordered the evacuation of the Suvla and Anzac positions. This was carried out without any loss on Dec. 20, by a most brilliant operation. The plan, worked out by Gen. Birdwood, was to remove guns and other material by night while apparently holding positions as usual by day. The bombardment of the Turkish lines was maintained to as great an extent as was possible, and the enemy was deceived still further by bogus guns being emplaced in the positions of the real guns which had been taken away. The final embarkation was fixed for Dec. 18 and 19. On the latter day a covering attack was made by the forces in the Krithia area, at a cost of 283 casualties. By 5.30 a.m. on Dec. 20 the last man quitted the British trenches in the Suvla-Anzac area, the transports stole out of the bay, and the warships followed later. The evacuation was absolutely successful. The Turks were completely unaware of what had taken place, and went on bombarding the empty British positions.

#### Final Evacuation

On Dec. 27 the evacuation of the position at Cape Helles was sanctioned and was carried out on Jan. 8-9, 1916.

The very success of the first evacuation militated against the chances of a like success in the Cape Helles area. It was not to be expected that the enemy would be deceived a second time in the same way. Yet actually that was what happened, perhaps because the Turks never imagined that the same thing could be worked twice.

In the last days of 1915 the evacuation began—men, guns, and stores being taken down to the beaches of Helles, in the same way as at Suvla and Anzac, while the firing lines of the British appeared to be maintained precisely as if nothing of the sort was proceeding. The French made use of beach S, the British of the other beaches. On Dec. 29-31 the 52nd Division made a demonstration to throw dust in the enemy's eyes, and for some days afterwards a fairly constant and heavy fire was kept up all along the Allied front. Two nights were allotted to the final embarkation—Jan. 7 and 8.

Bad weather made the final steps of the evacuation very difficult, the landing-stages and connecting piers being washed away. But the storm had at least the effect of covering the final withdrawal from the enemy, who, as at Suvla-Anzac, had no notion that the Allies had evacuated Gallipoli. The first intimation that reached him was conveyed by the blazing on the beaches of the stores which had been left behind, and which had been fired simultaneously by time-fuses. Then he heavily shelled the abandoned beaches and trenches, nor did he cease firing until the sun rose and revealed that the Allies had got clear away. The total casualties incurred in the operation amounted to one man wounded. The one unequivocal and perfect success of the Gallipoli Expedition was the evacuation of the peninsula.

#### Causes of the Failure

From first to last 468,987 men were employed by the British, with losses of 33,522 killed, 7,636 missing, and 78,420 wounded, in addition to an enormous total invalidated. The French force employed was probably over 80,000, with proportionate casualties. The causes of the failure include inadequate strength—for the Allied forces were thrown in piecemeal, and there were never more than 100,000 infantry available; defective ammunition supply; and the defiance of principles of naval and military strategy. There were some who declared that these operations diverted men and munitions from France at a critical time, but this was a controversial statement. Certainly the failure encouraged Bulgaria to throw in her lot with the Germans. At the same time it is true that the Gallipoli campaign prevented the Turks from concentrating against Russia, and inflicted upon them very heavy losses, totalling, according to

Liman von Sanders, 66,000 killed and 152,000 wounded.

On Nov. 8, 1918, under the conditions of the armistice with Turkey, the Gallipoli forts and peninsula were occupied by British troops, and on the following day the first British ships since the outbreak of war passed up the straits for Constantinople.

**Bibliography.** Reports of the Dardanelles Commission, 1917-18; Gallipoli Diary, Sir Ian Hamilton, 1920; Gallipoli, John Masefield, 1923; Official History of the Great War—Military Ops.: Gallipoli, C. F. Aspinall-Oglander, 2 vols., 1929-31; The World Crisis, Winston S. Churchill, 1923-29 (vol. ii); Gallipoli, Alan Moorehead, 1956.

**Gallium.** Metallic element of the aluminium group. It was discovered in 1875 by Lecoq de Boisbaudran, who found it in some zinc blende from the Pyrenees. Extremely rare, it may be found in traces in blendes, some magnetites, iron, aluminium ores, etc. It can be isolated chemically or electrolytically. The metal is crystalline, similar to steel in colour, but like tin when melted. It melts at the low temperature of 30° C. and will remain liquid down to room temperature.

Gallium, symbol Ga., has the atomic number 31; atomic weight 69.72; and the crystal structure is orthorhombic with 8 atoms in the unit cell. The metal does not readily oxidise, but reacts with chlorine, bromine, and iodine; is dissolved rapidly by hydrochloric acid and more slowly by nitric acid; and forms numerous salts. It is frequently found in amounts between 0.01 and 0.03 p.c. in aluminium prepared from bauxite. Gallium has been added to low melting alloys with indium, and these alloys may have applications in surgery.

**Gall Midge.** Group of true flies (family Cecidomyiidae) which cause gall-formation on plants. They are minute, delicate insects with antennae bearing whorls of long hairs and almost veinless wings. Their larvae or grubs cause the terminal rosette galls common on hawthorn and willow and the pinkish pustules on the leaves of meadowsweet.

**Gallon.** British standard measure of liquid and dry capacity. The exact volume of the gallon has varied from time to time, that of Henry VII being 274½ cu. ins., and the wine gallon of Queen Anne, 1707, being 231 cu. ins., but it became standardised by the Act, 5 Geo. IV, c. 74, in 1824, as containing 277.274 cu. ins. This figure

was fixed by taking the volume of 10 lb. of distilled water measured at barometric pressure 30 ins. and temperature 62° F.

The gallon is divided into four quarts or eight pints, and equals 4.54346 litres. Two gallons make one peck. The gallon in the U.S.A. and Canada is that of Queen Anne, 231 cu. ins. The word itself is of doubtful origin, possibly connected with the French *jale*, bowl, the *-on* being augmentative, and thus meaning a large bowl.

**Galloon** (Fr. *galon*, Span. *galón*). Worsteds lace or trimming of cotton or silk, or woven with a metallic thread. It is used on uniforms.

**Galloway.** District of S.W. Scotland. Comprising the counties of Kirkeudbright and Wigton, it is now divided into three portions—East, West, and the Rhinns of Galloway, a double peninsula of Wigtonshire. It is noted for a celebrated breed of horses and hornless cattle. It gives its name to a county constituency. S. R. Crockett put the scenic background into his novels. A scheme to supply electric power by harnessing the river Dee was completed in 1935, the river being dammed at Clatteringshaw.

**Galloway, MULL OF.** Promontory, the extreme S. point of Scotland. It has a lighthouse (86 ft. high), and there are remains of Scandinavian defences and the chapel of S. Medan, which was erected around a natural cave.

**Gallowglass** OR GALLOGLASS. Name given to the members of the armed retinues of ancient Irish and Scottish chiefs. They were heavy-armed foot soldiers, in contrast with the kerns or caterans, who carried only light weapons. The word is an adaptation of the Gaelic *gall-oghlach*, meaning a foreign servitor.

**Gallows.** Apparatus used for the execution of criminals. It consists usually of two posts with a horizontal beam, to which is fastened the execution rope. In some forms of gallows there is only one upright post, with a projecting beam. These are more generally called gibbets, and from them were hung malefactors in chains as a warning to others. Until the passing of the Act of 1868 gallows were erected in public, the most notorious being

those at Tyburn, and in front of Newgate. The criminal was slowly strangled, the trap-door and drop being modern. See Execution.

**Gall-stones** OR BILIARY CALCULI. Masses consisting chiefly of cholesterol and bile-pigments which are formed in the gall-bladder, and much less frequently in the substance of the liver. In the gall-bladder the number of calculi may vary from a single stone, perhaps measuring as much as four inches across, to many hundreds of small stones; those formed in the liver are usually small grains.

The cause of gall-stones is catarrhal inflammation of the mucous membrane of the gall-bladder. This inflammation is set up by micro-organisms in the presence of an overplus of cholesterol or bile pigment with sluggish bile flow. Often the condition follows an attack of typhoid fever. "Every gall-stone is a tomb-stone." The formation of gall-stones is rare in those below 25 years of age and most frequently occurs after 40. Women are more liable to the condition than men. Lack of exercise, over-eating, and constipation are predisposing factors, but in addition there is some biochemical reason which determines an error in the chemistry of cholesterol.

Gall-stones may exist in the gall bladder for years without causing any symptoms. The presence of small stones and "biliary sand" may give rise to spasmodic pain, generally attributed to dyspepsia but in reality caused by cholecystitis. The passage of a stone may set up violent biliary colic, agonising pain, vomiting, sweating, and collapse. If the stone passes into the intestine the symptoms abate suddenly, but if the calculus becomes impacted in the common bile duct (the channel leading from the gall-bladder to the intestine) distress continues and intense jaundice ensues. This impacting of a stone demands surgical intervention. The medical treatment of biliary colic consists in relieving the pain by hypodermic injections of morphia (possibly in the form of pethidine) and by giving belladonna and sodium salicylate by mouth. In a convalescent patient, magnesium sulphate (Epsom salts) prevents the stagnation of bile.



Gallows. Wayside gibbet once used for malefactors

**Gallup Poll.** A referendum to measure public opinion, named after the American Dr. George Gallup, who developed the technique. The method was to sound the opinions of a relatively small number of persons carefully chosen to be representative of larger groups. Those to whom the questions were addressed included people of all ages, political and religious opinions, income groups, and occupations, in the same proportion as these groups were found to exist among the whole population. Gallup founded the American Institute of Public Opinion in 1935, and similar institutes came into being in many other countries. In 1945 and 1950 Gallup polls forecast the voting in British general elections within 2 per cent.; but all such polls showed a marked failure to estimate voting in the 1948 U.S. presidential election.

**Gallus, GAIUS CORNELIUS** (d. 26 B.C.). Roman poet, born at Forum Julii (Fréjus) in Gaul. His distinguished public career, under Augustus, culminating with the governorship of Egypt, was brought to an abrupt conclusion by his disgrace, leading to loss of his estates and suicide at the age of 43. His works, four books of love poems, are lost, but there is no doubt of his eminence in Latin literature. In technique Gallus was ranked with Horace and Virgil.

**Gallus, TREBONIANUS.** Roman emperor, A.D. 251-253. Governor of Lower Moesia during the campaign of his predecessor Decius against the Goths, he is blamed for deliberate failure to effect a junction with Decius, which led to the defeat and death of the latter in the marshes of the Dobruja. Proclaimed emperor, Gallus concluded a humiliating peace with the Goths, and proceeded to Rome, but in 253 he was defeated and slain at the battle of Interamna (Terni) by the usurper Aemilianus.

**Gall Wasp.** Group of hymenopterous (membrane-winged) insects, nearly related to the wasps, and often incorrectly called gall flies. They are all very small, either black or brown; usually the insect in its larval stage is parasitic on plants. The galls found on the

stems and leaves of many trees are often caused by the attacks of these insects; though certain beetles, flies, and aphides also cause them.

The female gall wasp pierces the outer skin of the leaf or stem with her ovipositor, and leaves an egg in the wound. The presence of this egg, or of some fluid accompanying it, causes the plant to develop an abnormal growth of tissue around it, which soon assumes the appearance of the familiar gall. In this the larva lives and feeds, only emerging as it reaches maturity. Each species of gall wasp affects one particular plant and keeps to it, and the resulting galls are characteristic of both plant and insect. One of the most familiar is the oak marble gall, which is hard and spherical; but there are many other and diverse forms found on the oak, including the oak apple. In the wild rose, the gall takes the form of a mossy outgrowth, known as a bedeguar, usually containing larvae. Many gall wasps exhibit the phenomenon of alternating generation: sexual propagation and parthenogenesis taking place in turn.

**Galop** (Fr.). Dance popular in England at the end of the 19th century. It is danced to two-four time, the movements being a quick sliding step down the room and then one of rapid revolution.

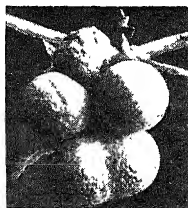
**Galston.** Police burgh and parish of Ayrshire, Scotland. It stands on the Irvine, 5 m. E. by S. of Kilmarnock on the railway. The centre of an agricultural district, Galston has muslin, lace, and blanket factories. Market day, Wed. Pop. (1951) burgh, 4,559.

**Galsworthy, JOHN** (1867-1933). English novelist and dramatist. Born at Coombe, Surrey,



John Galsworthy,  
English novelist  
and dramatist

Aug. 14, 1867, he was educated at Harrow, and at New College, Oxford. Called to the bar in 1890, he did not pursue law, but travelled extensively and devoted himself to writing, at first under the pseudonym of John Sinjohn. His early stories attracted only little attention, as did his novel *The Island Pharisees*, pub-



Gall Wasp. Galls formed  
on oak by *Cynips Kollari*

lished under his own name in 1904. Two years later the first novel in what was to become the Forsyte Saga (*q.v.*) launched him on his career as a social chronicler, with every accomplishment that observation and feeling could bestow; while his play, *The Silver Box*, produced the same year, placed him at once among the first dramatists of his time as one who could direct an almost flawless technique to serve an original and arresting theme.

The Forsyte Saga and its sequels remain his greatest contribution as a novelist. Other novels were *The Country House*, 1907; *Fraternity*, 1909; *The Patrician*, 1911; *The Dark Flower*, 1913. He also published volumes of collected short stories, some of which, notably *The Apple Tree*, take their place among the most accomplished of their kind.

His plays were perhaps more immediately expressive than his novels of the workings of his finely balanced mind, one that was unusually sensitive to its perception of both sides of a question, moral or social, and by holding the scales with scrupulous fairness could make an indictment seem the more damning. *The Silver Box* raised problems of social injustice as between rich and poor; *Strife* (1909) poised the relations of capital and labour. *Justice* (1910) so forcefully presented the tragedy of the wrongdoer, crushed by the penal system rather than by human persecution, that it resulted in some immediate reform of the evils he displayed, notably in the matter of solitary confinement. Other plays include *The Pigeon* (1912); *The Mob* (1914), a study of altruism pitted against mass passion; *The Skin Game* (1920), ostensibly dealing with the clash of the older and newer ruling classes but actually revealing in subtle allegory all the standards England had lost in the recent war; *Loyalties* (1922), another characteristic presentation of conflicting passions not confined to the central theme of Jew versus Gentile; and *Escape* (1926), showing reactions of the normal world to a hunted convict. All Galsworthy's plays were collected in a single vol., 1929. He died Jan. 31, 1933.

Galsworthy refused the offer of a knighthood in 1918, but was



awarded the O.M. in 1929, and received the Nobel prize for literature in 1932. He played a considerable part in the campaign for the humane slaughtering of animals, and his great desire for better international understanding led to his very practical interest in the P.E.N. club. Consult John Galsworthy, H. Ould, 1934; Life and Letters of J. G., H. V. Marrot, 1935; Memories of J. G. by his sister, M. E. Reynolds, 1936.

**Galt.** City of Ontario, Canada. In Waterloo co., it lies 25 m. W. of Hamilton and 60 m. S.W. of Toronto, being served by C.P.R. and C.N.R. It makes edged tools and farm implements for the surrounding agricultural district. It was named after John Galt (v.i.). Pop. (1956) 23,738.

**Galt, Sir Alexander Tilloch** (1817-93). Canadian statesman. Son of John Galt (v.i.), he was born Sept. 16, 1817, emigrated to Canada in 1835, and took part in the development of Quebec. In 1849 he entered the Canadian legislature, and during 1858-62 and 1864-67 was finance minister.

He made the financial arrangements of the dominion when established in 1867, and was its first finance minister. During 1880-83 Galt was high commissioner for Canada in London. He died at Montreal, Sept. 19, 1893.

**Galt, John** (1779-1839). Scottish novelist. Born May 2, 1779, at Irvine, Ayrshire, he was a clerk at Greenock, first in the customs and then in a mercantile house. Having travelled abroad, in 1813 he issued his Letters from the Levant, and in 1821 Annals of the Parish, his best known book. There followed The Entail, 1823; The Omen, 1825; and The Last

of the Laids, 1826. Galt was in Canada, 1826-29, as agent of the Canada Company. Later he brought out Lawrie Todd, 1830, and Boyle Corbet, 1831, novels of settler life. He died April 11, 1839. Consult John Galt, J. W. Aberdein, 1936; Novels of John Galt, F. H. Lyell, 1943.

**Galton, Sir Francis** (1822-1911). British anthropologist and meteorologist. Born near Birmingham, Feb. 16, 1822, a cousin of Charles Darwin, he studied medicine, travelled in the Sudan, 1846, and explored Damaland, 1850.



Sir Francis Galton, British scientist

He formulated a theory of anticyclones and introduced new methods of weather-charting, embodied in Meteorographica, 1861, from which arose his long association with the Meteorological Council. His works, Hereditary Genius, 1869, and Inquiries into Human Faculty, 1883, established the principles of what he termed eugenics, in furtherance of which he founded a laboratory, 1904, bequeathing £45,000 for a chair in London. He devised composite portraiture and systematised finger-print methods. He was knighted in 1909, and died Jan. 17, 1911. (See Finger Print.) An autobiography, Memories of My Life, appeared in 1908; Life and Letters, ed. K. Pearson, 1931.

**Galtonia.** Small genus of bulbous herbs of the family Liliaceae. Natives of S. Africa, they have more or less erect strap-shaped leaves, about 30 ins. long. They have also a tall scape (4 ft.) bearing at its summit a loose truss of drooping bells which, in *G. candicans*, the better known of the two species, are pure white and fragrant.

**Galty** or **Galtée.** Range of mts. in Ireland. It extends for 15 m. in an E. to W. direction through the counties of Tipperary and Limerick. Galtymore, the highest peak, attains 3,015 ft.

**Galuppi, Baldassare** (1706-85). Italian composer, born on the island of Burano, near Venice, Oct. 18, 1706. He became famous as a composer of light operas, frequently in collaboration with Goldoni. His works enjoyed popularity in England, particularly Alexander in Persia, performed 1741, and Il Filosofo di Campagna, performed as The

Guardian Trick'd, 1761. Master of music in S. Mark's, Venice, from 1762, he died Jan. 3, 1785. R. Browning's poem, A Toccata of Galuppi's, has helped to keep his name alive.

**Galvani, Luigi** (1737-98). Italian physiologist. Born at Bologna, Sept. 9, 1737, he became in 1762 professor of anatomy at Bologna university, resigning for political reasons in 1797. By experiment, largely on frogs, he discovered animal electricity, and his investigations are commemorated in certain electrical manifestations and terms, e.g. galvanism and galvanometer. His work On the Force of Electricity in Muscular Movement was published in 1791. He died Dec. 4, 1798. His collected works were pub. at Bologna, 1841-42.

**Galvanic Battery.** Name given to a cell for producing electricity by chemical action. The name voltaic cell is now generally used in place of galvanic battery. Both names are derived from those of the electrical pioneers, Galvani and Volta. See Cell.

**Galvanising.** Method of coating iron with zinc. It was devised by Malouin, French chemist, in 1742. In galvanising, the zinc coating does not merely lie on the surface of the iron as a sheet of paper might, but actually combines or alloys with the iron, penetrating the latter to an appreciable extent.

The modern process is in all essentials as proposed by Malouin, the principal departure being the use of sal-ammoniac as a covering to the molten zinc and as a flux, a modification patented by Crawford in 1837.

Today the process is chiefly applied to the coating of thin sheets of iron or steel intended to be used for roofing and other building purposes, and to wire. Sheets are usually delivered black with the scale on them to the galvanising works, where the scale is removed, then dipped in a "pickle" of



Galtonia leaf and truss of bell-shaped flowers

hydrochloric acid or hot sulphuric acid, withdrawn, washed with water, often rubbed with sand, and then passed through a bath of molten zinc covered with sal-ammoniac. As the sheets emerge they are scrubbed with revolving wire brushes. When desired, the sheets are subsequently corrugated. Wire for galvanising is reeled continuously through both the pickle trough and the zinc bath. Wire netting is woven while black and then galvanised. For the best sheets 2 to 3 p.c. of tin is added to the zinc. The proportion of zinc taken up by the metal may range from 25 p.c. in fine wire to 6 p.c. in anchors, chains, and other large objects.

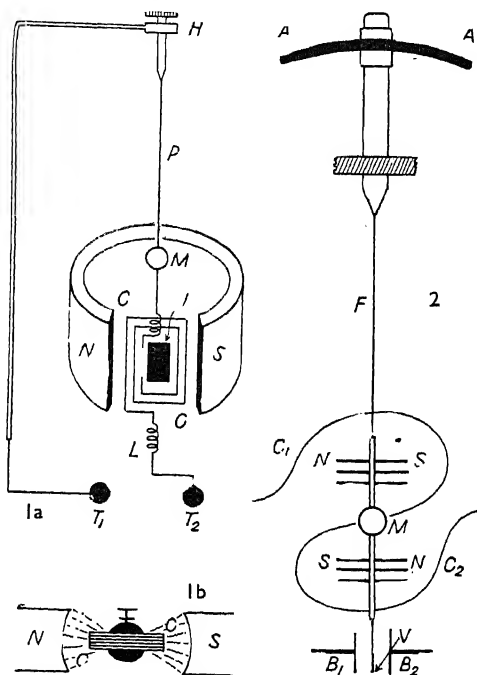
Galvanised sheets cannot be employed in contact with acids or caustic alkalis or for the preparation of containers for food products where organic acids may be present. (See Zinc.)

A modification of this "hot-dip" process is electro-galvanising, in which the protective coating of zinc is produced by electroplating (*q.v.*). The electrolyte is usually an acid solution of zinc sulphate; for complicated parts, an alkaline zinc cyanide bath may be used. The anode is pure zinc.

**Galvanism.** Use for medical purposes of the galvanic current, *i.e.* electricity produced by chemical action. The subject is treated under Electrotherapeutics.

**Galvanometer.** Instrument used for the detection or measurement of small electric currents. The force deflecting the pointer (or other indicator) may be due to either the electro-magnetic or the thermal properties of a current; while the controlling force which limits the deflection is a spring or gravity control in ammeters and voltmeters and the torsion of the suspension in suspended or moving coil galvanometers. In moving needle galvanometers the restraining force is provided by the earth's (or other permanent) magnetic field.

Fig. 1 (*a*) gives a diagrammatic representation of the features of a suspended coil galvanometer. The coil *C* is suspended at its upper end by a thin phosphor bronze strip *P* (which has a smaller torsional control than a wire of equal mechanical strength), and attached at its lower extremity to a loosely coiled spiral *L*. The current to be measured or detected is led to and from the instrument via the terminals *T*<sub>1</sub> and *T*<sub>2</sub> which are electrically connected to *P* and *L* respectively. The coil moves be-



Galvanometer. 1. Diagrams showing principle of a suspended coil galvanometer. 2. Moving needle instrument. For lettering, see text

tween the curved poles *N* and *S* of a permanent magnet (Fig. 1 *b*) and is provided with a central soft iron core *I* so that a radial magnetic field is produced, as indicated by the dotted lines.

This device results in the deflecting couple remaining constant over quite large rotations of the coil and so the angle of deflection is strictly proportional to the current flowing. The mirror *M* reflects a spot of light from a lamp on a distant scale.

In the moving needle instrument (Fig. 2) an astatic arrangement of magnets is employed and two fixed coils *C*<sub>1</sub> and *C*<sub>2</sub> are arranged so that the deflecting forces of the currents are in the same sense but the controlling forces on the two suspended magnet systems are in opposite directions because of the field of the permanent magnet *AA*.

In order that the deflections of a galvanometer should be observed in the minimum time, some form of damping device is provided in the moving needle instrument by the use of a light vane *V* (Fig. 2) at the lower end of the suspension. *V* moves in the small air space between the two plates *B*<sub>1</sub> and *B*<sub>2</sub> and suffers viscous damping.

These instruments are unsuitable for measuring alternating currents, but a moving coil instru-

ment known as the Einthoven string galvanometer is employed for this purpose. Here the coil is replaced by a conductive fibre or a fine wire (0.01 mm. diameter) which is maintained taut in a narrow gap between the poles of an electro-magnet. The deflection of the fibre (or wire) is observed by a microscope or by projection on to a screen or photographic film. The period of such an instrument is necessarily small, 0.01 sec. or less.

Alternating currents may also be measured indirectly by their heating effect in a subsidiary coil, which raises the temperature of a thermo-junction

forming part of the loop of a galvanometer moving coil. The resulting direct current in the latter coil will react with the magnetic field in which it is suspended and will suffer deflection.

**Galveston.** City and port of entry of Texas, U.S.A. The co. seat of Galveston co. lies across the E. end of Galveston Island at the entrance to Galveston Bay. It is 49 m. S.E. of Houston and is on five main rlys., a canal, two causeways, and the Canada-to-Gulf highway; it also has an airport. The "oleander city" faces the Gulf of Mexico to the S. and has a harbour in the bay to the N. It is the second port in the U.S.A. by volume of foreign commerce and one of the principal ports in the world for cotton and sulphur. It exports wheat, cotton seed oil, copper and iron ore, lumber and timber, crude and refined oil, etc.

Galveston has unequalled facilities for storing cotton. Grain ships can be loaded in a single day. There are large dry dock and ship repair services. Other industries are tin smelting, wire making, oil refining, flour milling, iron and cement working. Here are the schools of medicine and nursing of Texas university, also an R.C. university and schools. A seaside resort with an annual mean

perature of nearly 70° F., Galveston welcomes a million visitors a year to its beaches.

First visited by Spaniards about 1781 and named probably in honour of Bernardo de Galvez, governor of Louisiana, Galveston was settled for the U.S.A. in 1837 and incorporated in Texas two years later. During the Civil War it was blockaded by the Federal navy, which occupied it Oct. 8, 1862, but it capitulated to the Confederates Jan. 1, 1863. In 1885 the city was badly damaged by fire, but a greater catastrophe was the hurricane of Sept. 8, 1900, which flooded the city to a depth of 16 ft., killed 8,000 people, and did damage estimated at £4,000,000. A wall higher than the high-water mark of that storm was built, and justified itself in 1915 when a storm of greater velocity caused no loss of life. In 1901 Galveston instituted the commission form of local govt. Pop. (1950) 66,568.

**Galveston Bay.** Inlet of the Gulf of Mexico. Protected by the island of Galveston and by a narrow promontory stretching W.S.W., it extends inland for about 35 m.

**Galway.** County of the Irish Republic, in Connacht. Its area is 2,293 sq. m., the second largest (after Cork) of the Irish counties. It has a coast-line of about 400 m. on the Atlantic, where are several bays with excellent harbours, and off which are a number of islands; the former include Killary, Kilkieran, and Galway; the latter include the Aran Islands, Inishbofin, Gorumna, and Lettermore.

The county is one of the wildest and most beautiful parts of Ireland, especially its western portion. The E. part is flat and boggy; the W., known as Connemara, contains the mountain group of the Twelve Pins. Joyce's Country is an adjacent mountainous district, while a third is called Iar Connacht. In the S. are the Slieve Aughty mts. and a stretch of the Golden Vale; on the N. there is another fertile area.

The Shannon flows along the borders of the county, which has few other rivers. Lough Corrib is the most notable lake; it is 4 m. from Galway and is about 50 sq. m. in area. On it are a number of inhabited islands. The chief industries are the rearing of cattle, sheep, and poultry, while there are many fishermen here. Oats and potatoes are grown, limestone and black and red marble are worked, and there are some manufactures of linens and woollens. The chief

places are Galway, Ballinasloe, Loughrea, Tuam, Oughterard, Clifden, Athenry, Portumna, and Gort. There are cathedrals at Tuam and Clonfert. A number of small places are visited by tourists and sportsmen. There are prehistoric remains on the Aran Islands. Nine members are elected to the dáil. Pop. (1951) 160,124.

**Galway.** Seaport, market and co. town of Galway, Irish Republic. It stands on the N. side of Galway Bay, at the mouth of the Corrib, and is 133 m. W. of Dublin by the state rly. It has a good harbour. There are some interesting old buildings, several, including Lyncht Castle, in the Spanish style. The town is divided into old and new portions.

The chief church is S. Nicholas, founded 1320, which for a long time had a college attached to it. S. Augustine's is modern. As the chief town of Connacht, Galway has a university college. This was founded as Queen's College in 1845. The town has fisheries and a considerable shipping trade; its other industries include flour mills, distilling, marble polishing, and making women's hats. Owing to its situation on the most Westerly harbour of the British Isles, it has often been proposed as a great Atlantic packet station. Galway is an urban district. Market days, Wed. and Sat. Pop. (1951) 21,271.

**Galway Bay.** Inlet on the W. coast of Ireland, between cos. Clare and Galway. It is protected at the entrance by the Aran Islands, which form a natural breakwater against the storms of the Atlantic Ocean. Its length is 30 m., and its breadth at entrance 22 m.

**Galway, GEORGE VERE ARUNDELL MONCKTON-ARUNDELL, 8TH VISCOUNT (1882-1943).** British administrator. He was descended from a family holding an Irish peerage since 1727, and his father, 7th viscount, was created a peer of the U.K. as Baron Monckton in 1887. George was born March 24, 1882, educated at Eton and Christ Church, Oxford, had a distinguished military career from which he retired in 1929, and succeeded to the title in 1931. He was governor-general of New Zealand 1935-41. He died March 27, 1943, and was succeeded in the peerage by his son Simon (b. 1929).

**Gama, VASCO DA (c. 1460-1524).** Portuguese navigator. Born at Sines of an ancient noble family, he took to the sea as a lad. He commanded the expedition sent by Emanuel I to find a sea

route to India round S. Africa; four ships sailed from the Tagus, July 9, 1497, rounded the Cape, touching at Natal on Christmas day, 1497, and crept up the E. shores of Africa to Malindi, whence going E., they sighted the Malabar coast at Calicut, May 20, 1498.

In 1502 he sailed again to the E. with ten vessels, to take vengeance for the murder of crews left at Calicut by Cabral. Da Gama sacked the town, explored the coast as far as Cochin, and returned home with merchandise; he was given the title admiral of India.

In 1524 he was appointed viceroy of India, but died of fever at Cochin on Dec. 24. More than anyone he was responsible for the age of Portuguese prosperity, and he is the hero of the *Lusiads* of Camoens. *Consult* V. da G. and his Successors, K. G. Jayne, 1910.

**Gamaliel** (d. c. 52). Jewish rabbi. The grandson of Hillel, he was an important member of the Sanhedrin. S. Paul attended his school at Jerusalem, as a youth. Famed for his learning, piety, and tolerance, he urged that the early preachers of Christianity should not be interfered with. The legend of his conversion to Christianity has no foundation.

**Gamba** (Ital., leg). (1) Abbrev. of viola da gamba, one of the large viols, played between the knees of the performer. (2) Organ stop, usually of 8 ft. pitch, with a reedy tone like that of the stringed instrument. *See* Organ; Viol.

**Gambella.** Town of Abyssinia, 160 m. E. of the Sudan frontier. It is situated on the Baro, a tributary of the Sobat, which is navigable during the summer floods; steamship services connect it with Nasir and Khartum. By a treaty of May 15, 1902, it was leased to the Sudan government as a trading station, with the proviso that it should not be militarily occupied. During the Second Great War Gambella was the centre of an operation in March, 1941, falling to British troops on the 23rd.

**Gambetta, LÉON (1838-82).** French statesman. Born at Cahors, Lot, April 2, 1838, his father being a grocer of Genoese origin, he became a law student in Paris, and was early prominent for his republican enthusiasm. Called to the bar in 1859, in 1868 he made a deep impression by his defence of the journalist Delescluze, who had been prosecuted for proposing a monument to Charles Baudin, killed in the *coup d'état* of 1851.

Elected to the chamber in 1869, Gambetta became a leader of the uncompromising anti-imperialist party. A speech attacking the Ollivier ministry in 1870 helped to bring about the May plébiscite on the proposed constitutional changes.



*Léon Gambetta*

When the news of Sedan arrived, Gambetta proclaimed the Third Republic, and became minister of the interior, Sept. 4, 1870. On Oct. 7 he escaped from the besieged capital in a balloon, and joined the government at Tours as minister of war as well as of the interior.

At Tours, and later at Bordeaux, aided principally by de Freycinet, he showed astounding energy, in most adverse circumstances, in levying and equipping fresh armies and organizing plans of national defence. Elected to the national assembly for Strasbourg, he resigned office when the surrender of Alsace was acquiesced in, and retired to Spain.

In the summer he returned to politics, founding the newspaper *La République Française* in Nov., 1871. Henceforth his energies, popularity, and oratorical gifts were directed towards consolidating the new republic against monarchist influences, and he was a determined opponent of MacMahon and the clerical reactionary party during his presidency. Gambetta was elected president of the chamber of deputies in Jan., 1879, and under Grévy's presidency was premier from Nov., 1881, to Jan., 1882, resigning on the defeat of his proposals for electoral reform. An accidental wound from a pistol brought about his death at his villa, near Sèvres, Dec. 31, 1882. The Gambetta monument in the Place du Carrousel, Paris, by Boileau and Aubé, was erected in 1886. On Nov. 11, 1920, to mark the jubilee of the republic, Gambetta's heart was buried in the Panthéon. *Consult* Life, P. Deschanel, 1920; Gambetta and the National Defence, J. P. T. Bury, 1936.

**Gambia.** River of W. Africa. It rises in Futa Jallon in French Guinea, flows generally W. from Kedugu for some 500 m., and falls into the Atlantic at Bathurst. At its estuary it is 12 m. broad, and it is navigable for 300 m.

**Gambia.** British colony in W. Africa. It is situated on both sides of the lower portion of the river Gambia, below the Falls of Barra Kunda, and includes the colony of St. Mary's Island and the five provinces, North Bank, South Bank, etc., which form a protectorate. The area of the colony proper is 29 sq. m., and that of the protectorate, which extends 250 m. inland, is 3,974 sq. m. In 1618 James I granted a charter to a trading company which built Fort James, and in 1631, 1662, and 1783 other companies were founded. Formerly part of the W. African Settlements, Gambia was made a separate colony in 1888. The capital is Bathurst (*q.v.*), on the island of St. Mary. Exports are chiefly ground-nuts, rubber, rice, hides, wax, and palm kernels. During the Second Great War there was troop movement in autumn, 1942, when the bluff of an impending attack on Dakar (*q.v.*) was staged. Troops from Gambia served with distinction in Burma against the Japanese. Pop. (1951) colony, 27,297; (1952) protectorate, 250,160; most of the people are Muslims.

**Gambier, GAMBIER, OR PALE CATECHU.** Extract prepared from the leaves and young shoots of *Uncaria gambier*, a climbing shrub which grows in the Malay Archipelago. The leaves are boiled with water, the decoction being evaporated to a thick syrup and allowed to set. Gambier is used chiefly for tanning, the purer qualities being employed in medicine as an astringent. The Malays use gambier, in combination with areca and betel, for chewing.

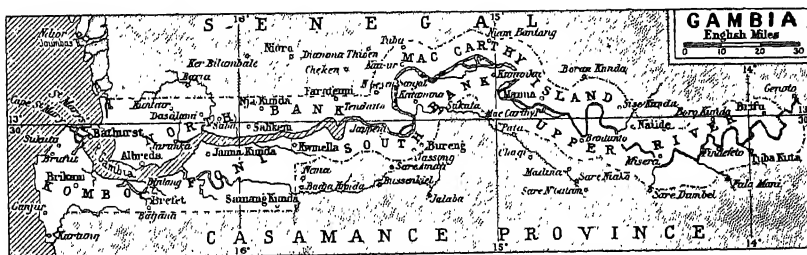
**Gambier.** Group of seven small islands in the Pacific Ocean, belonging to France. They lie in lat. 23° 12' S., and long. 135° W. Total land area 6 sq. m. The

largest island is Mangareva, and all are of coral formation. Most of the inhabitants are R.C. converts, with some immigrants from Easter Island. Pop. (est.) 1,600.

**Gambier, JAMES GAMBIER, BARON (1756-1833).** British sailor. Born at New Providence, Bahamas, Oct. 13, 1756, he went to sea at 11 years of age. In 1778 he was captured by the French admiral d'Estaing, but was released after a few months, and was present at the relief of Jersey, 1779, and at the capture of Charleston, 1780. In 1794 he commanded the *Defence*, which, in the battle of June 1, was the first to break through the enemy's line. In 1795 he was promoted rear-admiral and a lord of the admiralty, becoming vice-admiral 1799. In 1800 he was commander-in-chief at Newfoundland, and in 1804 returned to the admiralty. Here he ordered the discontinuance of the rule enjoining officers to enforce the salute from all foreign vessels within the king's seas, an order in force since the reign of John.

In 1805 he became admiral, and in 1807 sailed to the Baltic, bombarding Copenhagen and capturing the Danish fleet. For this he was raised to the peerage. In 1809 he commanded the *Channel* fleet when Lord Cochrane attempted to destroy the French fleet by fire-ships, an operation of which Gambier disapproved so strongly that he refused to help Cochrane, and himself demanded a court-martial for his failure of duty. He was acquitted, and retained his command until 1811, being promoted admiral of the fleet in 1830. He died April 19, 1833.

**Gambit.** Method of opening a game of chess in which by the sacrifice of a pawn or piece in one of the early moves a player seeks to obtain some advantage over his opponent. There are the king's gambit, queen's gambit, king's knight's gambit, etc. If the opponent declines to take the piece offered, this is a "gambit



Gambia. Map of the British colony and protectorate in West Africa

declined." The term comes from the Italian phrase *dare il gambetto* to trip up (*gamba*, leg).

**Gambling.** Staking money or other valuable commodity upon the as yet undecided issue of an event, particularly of a sporting event or of a game. The practice is of undiscoverable antiquity, but has always been discountenanced by the statute law of civilized communities.

Greeks and Romans had two principal games of chance, both played with dice. *Tesserae* were cubes, the faces marked I to VI as in modern dice, the points on the opposite faces totalling 7; the game was played with 3 *tesserae* shaken and thrown from a turret-shaped box upon the board; the highest throw, called *Venus*, was of 3 sixes, the lowest, or dog's throw, of 3 aces. *Tali*, or knucklebones, were oblongs, with two of the long sides broader than the others, and numbered 3 and 4, the narrower pair marked 1 and 6, and rounded ends unmarked. Four *tali* were used, the highest throw being when all showed different numbers, the lowest when all came out the same. Odd and even, head and tails, and mora, and an early form of backgammon were other games of chance in classical times. Games of chance were prohibited by law except during the Saturnalia, but gambling was rife in Rome.

According to Tacitus, the ancient Germans were bewitched with the spirit of play to an exorbitant degree. Their modern descendants were not innocent of the same vice, Wiesbaden, Homburg, and Baden-Baden being notorious gaming centres until their gambling-houses, with all the others in Germany, were abolished in 1872.

Cards were used for gambling there as they had been in England; in Belgium, at Spa, and Ostend, upon the suppression of the German houses, until suppressed there too in 1902; and as they still are in France at such resorts as Aix-les-Bains, Trouville, Biarritz, and especially in the principality of Monaco, the Mediterranean paradise in which roulette, trente-et-quarante, and rouge-et-noir are the triple-headed serpent. Systems innumerable have been devised by gamblers to render winning certain at all the games of chance, but never one of which the fallibility cannot be proved mathematically, or which cannot be defeated by the advantages reserved by the bank as in fixing the maximum which it will pay on

any chance and in retaining the *refait* of 31 at trente-et-quarante, and in the zero in roulette.

In England statute law against gambling originated in desire to protect the manlier sports of archery and the like from being abandoned in favour of idle games, but even Henry VIII, who was responsible for one of the earliest of these moral enactments, was not proof against the seduction of the dice. That reformed gambler, Theophilus Lucas, who wrote *Memoirs of Gamesters* as a warning to future generations, records that Sir Miles Partridge once played at dice with King Henry for the four largest bells in London, and won them. In the reign of Charles II the fashionable vice became a scandal. One statute of this period enacted that if any person by playing or betting lost more than £100 at one time he was not compelled to pay the sum, and the winner forfeited treble the amount.

The respect shown to the statute may be gauged by the fact that the duchess of Mazarin won 1,400 guineas in one night from Nell Gwynn at basset, and more than £8,000 from the duchess of Portsmouth, and derived no little financial advantage from doubtful play with the merry monarch. Even the more austere William III is said to have lost £2,500 to the professional gamester Richard Bourchier, who next proceeded to win £15,000 from the elector of Bavaria, a sum immediately doubled by tossing double or quits.

As Blackstone insists, gambling "taken in any light is an offence of the most alarming nature; tending by necessary consequence to promote public idleness, theft, and debauchery among those of the lower class; and, among persons of a superior rank, it has frequently been attended with the sudden ruin and desolation of ancient and opulent families, an abandoned prostitution of every principle of honour and virtue, and too often has ended in self-murder."

The gaming laws governing the practice in Great Britain, and the legally prohibited games, ace of hearts, basset, dice (except backgammon), fano, hazard, lotteries (with a few exceptions), and roulette, are dealt with under separate headings.

The economic nature of gambling is that as the result of a bet property is transferred from one to another upon the occurrence of an event which, to the two parties to the bet, was a matter of

complete chance, or as nearly so as their adjustment of condition could make it. Chance is the principle upon which the transaction is founded, in the mind at least of one of the parties. Chance enters into every human transaction, but the reason is always exercised to reduce its possible effect to the minimum. Into gambling, on the contrary, reason is introduced only so to adjust the element of chance as to make it the determining principle of the transfer, and the wrongfulness of the practice lies not in the indulgence in an intrinsically innocent act, but in the surrender to chance of acts which ought to be controlled by reason alone. See Betting.

**Bibliography.** *Memoirs of the Lives, Intrigues, and Comical Adventures of the Most Famous Gamesters . . .*, T. Lucas, 1714; *The History of Gambling in England*, J. Ashton, 1898; *The Ethics of Gambling*, W. D. Mackenzie, new ed., 1911; *The Law of Gaming*, H. A. Street, 1937.

**Gamboge.** A gum resin of a rich brownish yellow tint, obtained from *Garcinia morella*, a tree which grows in Siam, near the S.W. coast of Cambodia, whence the drug takes its name. It is imported in the form of sticks or cylinders, 1 in. to 2½ ins. in diameter and 4 ins. to 8 ins. in length, the shape being caused by the liquid juice of the tree being collected in lengths of bamboo cane. Gamboge was formerly used in medicine as a drastic purgative. Because of its brilliant colour, gamboge is sometimes used in water-colour painting, but it does not mix well and tends to dry with a shiny surface.

**Gambrinus.** Legendary king of Flanders, to whom is ascribed the invention of beer. In Germanic countries his name is sometimes used as a sign for beer halls and cellars, and the king is represented sitting across a barrel, holding in his hand a tankard of foaming beer.

**Game.** Name given to certain undomesticated animals taken in field-sports by coursing or shooting, and to their flesh when used for food. Game, as defined by the Night Poaching Act, includes hares, pheasants, partridges, black game, red grouse, and bustard. Some of these are high in flavour, and it is the custom to hang them in a cool place for several days before eating, that the flesh may become tender or short. Gamekeepers are servants employed by landowners to rear and preserve game, prevent poaching, and check the depredations of vermin

and birds of prey. A gamekeeper may call on any person to produce a licence if he finds him doing an act illegal without a game licence. *See* Close Time; Game Laws.

**Game,** SIR PHILIP WOOLCOTT (b. 1876). A British administrator. Game was born March 30, 1876, and educated at Charterhouse. He entered the Royal Artillery in 1895 and served in the S. African War and First Great War. Director of training and organization at the Air ministry, 1919-22, he was a member of the Air Council, 1923-28, and was placed on the retired list in 1929. He served as governor of N.S.W. 1930-35. He was then appointed commissioner of the metropolitan police, retiring in 1945. Created K.C.B. in 1924, he received the G.C.B. on retirement.



Sir Philip Game, British administrator

**Game Fowl.** Breed of domestic fowls descended from those used in the cockpits for betting purposes. The birds had as their ancestors the wild jungle-fowl (*Gallus bankiva*) of India. Up to the beginning of the 19th century the English game-fowl appears to have been little altered by domestication from the wild birds, having the strong beak, single upright comb, and the very long, sharply pointed spur at the back of the leg. It was sparsely built, and the feathers pressed closely to the body. The pugnacious disposition of the cock was shared by the hen, who could kill a rat in protecting her young, and the chickens, the young cocks crowing and fighting among themselves even before they had left their mother's care. *See* Cockfighting.

**Game Laws.** In England, the Acts which deal in a special manner with poaching and trespassing in pursuit of game; and those which impose restrictions on the killing of game, two very different matters. Game includes hares, pheasants, partridges, grouse, heath or moor game, black game, and bustards, and for some legal purposes, woodcock, snipe, quails, landrails, and rabbits.

Under the Larceny Act, 1861, it is a misdemeanour to kill or take any hare or rabbit in a warren by night, and a fineable offence (£5) to do so by day. By the Night Poaching Acts of 1828 and other years, it is punishable unlawfully

to take or destroy any game or rabbits by night in any open or enclosed land or road, highway, etc.; or to enter any land, enclosed or not, with gun, net, engine, or other instrument for taking or destroying game. A gamekeeper has power of arrest at night. Any policeman or constable may stop and search anyone whom he reasonably suspects of having been in unlawful pursuit of game. A licence is required to shoot or deal in game.

**Gamelin,** MAURICE GUSTAVE (b. 1872). French soldier. Born in Paris, Sept. 20, 1872, son of a general, Gamelin was educated at St. Cyr, and was chief of staff to Joffre in 1911. He commanded French forces in the Levant in 1925, becoming chief of the general staff in 1931. Supreme commander of all French forces from 1938, in Sept., 1939, he was made generalissimo of Allied armies on the Western Front. Replaced by Gen. Weygand on May 19, 1940, and on Sept. 9 arrested by the Vichy government, he was among the former military and



Gen. Gamelin, French soldier

political leaders of France whose indictments were heard at the trial by the supreme court at Riom (*q.v.*). On Oct. 6, 1941, Marshal Pétain sentenced Gamelin to detention at Bourrassol, whence he was transferred to Germany on April 4, 1943, by the Nazis. He was liberated by Allied troops from a secret prison camp on May 6, 1945. *See* France, Battle of.

**Games.** Word of Teutonic origin, meaning sports or amusements. The Latin word is *ludi*, hence the phrase used in the public schools of *victor ludorum*. Both Greece and Rome had their public games, the forerunners of the athletic meetings of today. Among the Greeks the chief games were the Isthmian, Nemean, Olympian, and Pythian. The idea has been revived in the modern Olympic Games (*q.v.*). *See* Athletics: also under separate games.

**Gamete.** Biological term which may be applied to any cell that unites during sexual reproduction with another, similar or dissimilar, to form the first cell of the new organism.

**Gametogenesis.** The process of gamete formation. Whatever the

nuclear constitution of the parent (animal or vegetable), the gametes are haploid (*q.v.*), a process of meiosis at some stage previous to gametogenesis reducing the diploid condition, where it exists, to a haploid condition. The vegetative cells of most gamete-producing plants contain a nucleus with one bundle of chromosomes (haploid), and in many lowly plants (*e.g.* Spirogyra) gametogenesis is simple, the protoplasts of previously vegetative cells becoming gametes. In others (*e.g.* Oedogonium) which form gametes of two kinds, protoplasts about to become oospheres become denser, and may also enlarge. In a few lowly plants (*e.g.* Fucus) whose vegetative body is diploid (*i.e.* has nuclei containing two bundles of chromosomes) the cells of oogonia and antheridia divide, meiosis (*q.v.*) occurs, and the oospheres and antherozoids, when formed, are haploid.

Typically the cells of animals are diploid, but meiosis induces a haploid condition in the spermatids, which later become either spermatozoa or ova.

**Gaming.** Term used mainly in law, and meaning practically the same as gambling. By the common law of England, a wagering contract or bet was as legal as any other. But by the Gaming Act, 1845, "All contracts or agreements . . . by way of gaming or wagering shall be null and void"; and no suit is to be maintainable for recovering any money or other stake alleged to be won on a wager. This does not apply to a prize to be awarded to the winner of any lawful game, sport, pastime, or exercise. A transaction in stocks and shares or any article of commerce is a wager, if the contract between the parties is not really to be a sale and purchase, but only a payment of differences depending on the rise or fall of the market.

The Betting Act, 1853, makes it illegal to keep or use any house, office, or other place for the purpose of betting or receiving money for bets. Until the Gaming Act, 1892, a commission agent who was employed by P to bet for him, and made himself personally liable for the losses, could pay the losses, although P ordered him not to do so, and recover the amount from P. By the Act of 1892 the agent loses this right. By Acts of Anne and William IV. bills and other securities given wholly or partly in paying of gaming debts, or in payment of money lent to pay gaming debts, are given upon an illegal consideration. *See* Betting.



**Gamma Rays.** Rays produced during the disintegration of radio-active elements. Their origin is nuclear. They are actually photons of great energy and very short wavelength, which gives them penetrating power usually stronger than that of the characteristic X-rays of heavy elements. Gamma rays can pass through several centimetres of lead before being reduced to half intensity. A beam of such rays is not usually monochromatic unless the softer components have been removed by filtration through large thicknesses of metal. The absorption law for monochromatic gamma rays is the same as for X-rays; in passing through a thickness  $x$  the intensity is reduced from  $I_0$  to  $I_x$ , where  $I_x = I_0 e^{-\mu x}$ ,  $\mu$  being the absorption coefficient. Gamma rays are not suitable for diagnostic work, as insufficient contrast is obtained between bones and flesh.

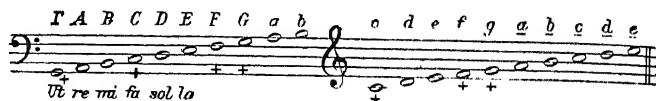
Their wavelength may be measured by a crystal method as for X-ray spectra, and these nuclear spectra can be analysed in the same way as optical spectra. When a gamma ray of frequency  $\nu$  is emitted by a nucleus, the energy released is  $h\nu$  where  $h$  is Planck's constant. Gamma rays exhibit similar properties to X-rays and ultra-violet radiation in that they can ionise gases, blacken photographic plates, and produce fluorescence. When allowed to collide with atomic nuclei, they can give rise to "pair-production," which consists in the actual creation of a positron and electron, the gamma-ray photon being absorbed in the process. In effect this means that electromagnetic energy is directly converted into energy of matter.

**Gammarus.** Genus of amphipod crustaceans. The fresh-water shrimp, *Gammarus pulex*, common in brooks, is about half an inch in length, and feeds on dead fishes. *G. chevreuxi* is used in genetical experiments. See Amphipoda.

**Gamp, MRS. SAIREY.** Character in Dickens's novel *Martin Chuzzlewit*. A monthly nurse, all too true to her contemporary type, drink-sodden, ignorant, incompetent, and in every other way reprehensible, she is nevertheless transmuted by her creator's genius into one of his richest comic characters. Her bulky umbrella gave us the colloquial term.

**Gamtoos** or **CAMTOOS.** River of the Cape Province. It rises in the Nieuwveld mts. and falls into St. Francis Bay, about 50 m. W. of Port Elizabeth, after a course of about 200 m.

**Gamut.** Musical scale of the Middle Ages based upon hexachords or series of six-note scales. The name comes from *gamma-ut*, the lowest note, so called from the Greek letter  $\gamma$  or gamma, and *ut*, the first note of the Sol-fa scale, later called *do* or *doh*. This note is still called by organ builders Gamut G. The complete gamut was:



The *ut-re-mi-fa-sol-la* series was started from each of the notes marked with an asterisk.

**Gandak, GREAT.** River of N.E. India. It rises in the Nepal Himalayas, and for some 30 m. forms the boundary between the Uttar Union and Bihar. It flows generally S.E., and joins the Ganges opposite Patna, after a course of about 400 m.

**Gandak, LITTLE.** River of N.E. India. It rises in the Nepal hills, flows parallel with the Great Gandak, and empties into the Gogra at Sunaria.

**Gandamak.** Village of Afghanistan. It was the scene of the massacre of the last survivors of General Elphinstone's army in 1842 in the retreat from Kabul. It is about 35 m. W. of Jellalabad on the road to Kabul. In 1879 an agreement made by Great Britain and Yakub Khan was known as the treaty of Gandamak.

**Gander.** Lake, river, bay, and airport of N.E. Newfoundland. In the Second Great War a huge airport was developed for the Atlantic ferry service near the settlement of Hattie's Camp, at an alt. of 400 ft. above Gander Lake and about 150 m. N.W. of St. John's. This later became a staging point on the commercial trans-Atlantic airways. Pop. (1951) 3,956.

**Gandersheim.** Tn. in the *Land* of Lower Saxony, Germany, famous for its medieval buildings and tradition. Standing on the river Gande, 36 m. S.W. of Brunswick, it has a former abbey, once Germany's most distinguished Benedictine nunnery, whose abbesses were members of ruling houses between 856 and 1589; this was later turned into a Protestant institution. The abbey, an imperial banqueting hall, and a palace of 1530, now serve as government buildings. A cathedral of 1172, a town hall of 1580, and old patrician houses are other attractions. The 10th century nun,

Roswitha von Gandersheim, has international fame as the author of the first medieval (Christian) drama and of epic poems in Latin. Pop. 3,120.

**Gandharva.** Deity in Hindu mythology. The name is also given to a class of divine beings sometimes vaguely described as beautiful spirits of singing stars.

**Gandhi, MOHANDAS KARAMCHAND** (1869-1948). Indian lawyer and national leader. Born at Porbandar, Kathiawar, Oct. 2, 1869, he was the son of Kaba Gandhi, of the bania caste of vaishnava Hindus, prime minister (like his father and grandfather before him and his eldest son after him) of the little state of Porbandar. Mohandas was educated first at Rajkot and later in London, where he matriculated, and was admitted to the bar at the Inner Temple. While in England (Gandhi came under the influence of Ruskin, Tolstoy, and Thoreau, from whose writings he derived his ideas of passive resistance).

On his return to India in 1891, Gandhi started to practise in the Bombay high court, but in 1893, accepting an engagement to represent an Indian firm in litigation then proceeding in Durban, he decided to set up practice there. In 1899, during the S. African War, he raised and was second in command, with the rank of sergt.-major, of an ambulance unit whose services were commended by the military authorities. In 1909 he renounced his practice to become hon. sec. of the Transvaal British Indian association, founding an Indian colony on Tolstoyan lines near Durban. In 1914, after some of the major restrictions against which Indians in S. Africa had protested were removed, he returned to India, on the way visiting England where he helped to organize an ambulance unit for service with the Indian troops in the First Great War.

On arrival in India he conducted a recruiting campaign for the Indian Army. From 1918, however, passive resistance, which he defined as *satagrahya* (soul force), played an ever-increasing part in the movement he led in favour of the Swaraj (self-government) in India. In 1919 the

passing of the Rowlatt Act, which gave the government permanent emergency powers for dealing with revolutionary activities, inspired Gandhi to develop resistance through non-cooperation. Gandhi's insistence on non-violence (ahimsa) was genuine but, as he himself had to admit on many occasions, his movement invariably led to violence, and much against their will the authorities condemned him to six years' imprisonment in March, 1922. He was released in 1924, when he became president of the Indian National Congress party.

Gandhi, who also preached the use of the handloom in revolt against the mechanisation of industry, became the idol of the Indian masses because of their conviction that his asceticism, earnestness, and eloquence marked the saint in him. Even his critics admitted that he had for the first time aroused in Indian minds a sense of self-respect and nationhood.

In 1930 he inaugurated a campaign of civil disobedience, which led to 8 months' internment. On March 6, 1931, he signed with the viceroy (Lord Irwin) a pact to end the disturbances produced by his 1930 campaign. He thereupon temporarily ceased non-cooperation and went to London to participate in the round table conference of 1931. In Jan. 1932, again involved in civil disobedience, he was arrested. During this term of imprisonment he underwent a three weeks' fast to secure acceptance of what was known as the Poona pact whereby the untouchables were given larger representation in the legislatures at the price of remaining within the caste Hindu constituencies—an apparent gain which was in fact vitiated by denying to the untouchables separate electorates.

In 1940, Gandhi instituted a campaign of individual civil disobedience which, after Japan's entry into the war, so nearly suggested a readiness to come to terms with the enemy that in 1942 he was interned again, being released in 1944 on health grounds. Though he resigned from the Congress party in Oct., 1941, he continued its virtual leader—a paradox possible only because of his unique standing in India's affection, long illustrated by popular bestowal on him of the title "mahatma" (great soul).

Gandhi, with other Congress party leaders, conferred with the British cabinet mission of 1946 and helped to secure acceptance by

their party of the terms which led to the election of a constituent assembly and the formation of an interim government. He continued to take a leading part in discussions until power was finally transferred to Indian hands, 1947; then announced his intention to settle in E. Bengal, i.e. in Pakistan. But the continuance of communal strife prompted him to announce



M. K. Gandhi, Indian lawyer and national leader

another fast until "sanity returned" to Calcutta. A calmer period followed in that city and the fast was abandoned. But early in 1948, in a desperate attempt to bring about Hindu-Muslim agreement, he began his 15th fast in 35 years, styled a "fast unto death." It ended on the sixth day, after Gandhi had been assured that Hindu discrimination against Muslims in Delhi would stop. On Jan. 30, 1948, while on his way to evening prayer at New Delhi, Gandhi was shot dead by a Hindu fanatic. His body was cremated on the banks of the Jumna, the ashes being later cast into the river at its confluence with the Ganges. His assassin, Nathuram Vinayak Godse, was, with an accomplice, hanged for the crime, Nov. 15, 1949.

Gandhi's published works include: *Indian Home Rule*, 1909; *Young India*, 1922; *Autobiography*, 1927-29; *The Story of My Experiments with Truth*, 1949.

Edwin Haward

*Bibliography.* Gandhi and Anarchy, Sir Sankaran Nair, 1922; Mahatma Gandhi, Gray & Parekh, 1924; Mahatma Gandhi, R. Rolland, 1930; Mahatma Gandhi: the Man and his Mission, H. S. L. Polak and others, 1932; Gandhi,

B. Sharga, 1933; Mahatma Gandhi, S. Radakrishnan, 1939; Gandhi, Carl Heath, 1944.

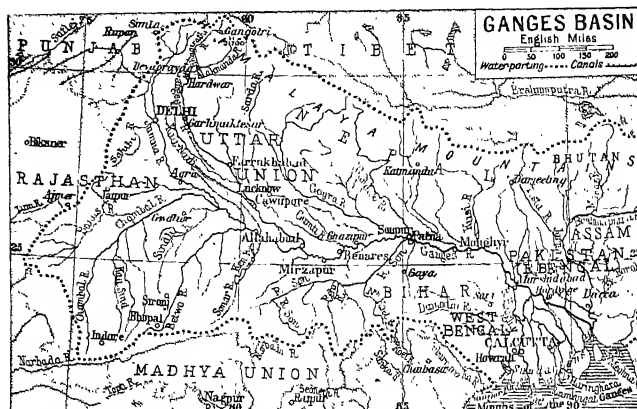
**Gandia.** Seaport of Spain, in the prov. of Valencia. It stands on the river Alcoy, 2½ m. from its small harbour, Grao, at the mouth, and 35 m. by rly. S.S.E. of Valencia. Enclosed by ancient ramparts it possesses a Gothic church, an old college, palaces of the dukes of Borgia and of Osuna, and a Jesuit convent. Fruit, wine, and tomatoes are exported. Pop. 12,676.

**Ganesha** OR HANA-PATI. In Hindu mythology, the god of wisdom, represented as a stout human figure with the head of an elephant.

**Ganges.** Most important river of India. It rises in two head-streams—the Bhagirathi and the Alaknanda—on the southern slopes of the Himalayas in lat. 30° 53' N. and long. 79° 8' E. The Bhagirathi issues from a glacial cavern at an alt. of over 14,000 ft. near the pilgrim town of Gangotri, takes in the Jahnvi and the Alaknanda, and from the junction of the latter stream at Devaprayag in the Uttar union, the river is known as the Ganges. Penetrating the mountains and flowing in a S.W. direction, it emerges from the mountainous tract and enters the plains close to the sacred city of Hardwar. Thenceforth it pursues a S.E. course to Allahabad.

From its source to this point the river is only a series of pools and shoals, with occasional rapids, but during the rainy season it becomes a raging torrent. At Allahabad, 670 m. from its source, it receives the waters of its largest tributary, the Jumna, and becomes a noble stream. The course of the river now trends E. and S.E., through the Uttar union and Bengal, receiving the Gumti, Gogra, Son, Gandak, and the main stream of the Brahmaputra—to fall into the Bay of Bengal by a deltaic system of the most intricate character. The length of its course is 1,557 m. The delta begins about 280 m. from the sea.

The Ganges is navigable as far as Garhmuktesar, 850 m. from the sea. In the upper reaches the rly. has led to a diminution of waterborne traffic, but within Bengal the river remains a teeming waterway. It is the most sacred river in India, and its junction with the Jumna at Allahabad is called the Tribenium, for tradition has it that there is a third underground stream, Saraswati, which effects its junction at the same spot. An underground temple in the fort at



Ganges. Map of the great river basin, from the rise of its headstreams to the delta in the Bay of Bengal

Allahabad contains the everlasting tree, the roots of which are supposed by legend to stretch down to the Saraswati.

At Sonpur another junction is formed with the Gandak, and that, too, has sacred significance for the Hindus, as also has the famous place of pilgrimage at Saugor Island at the mouth of the Hooghli. At these places annual bathing festivals are attended by thousands of pilgrims.

Among the chief towns on the river's banks are Cawnpore, Murshidabad, Farrukhabad, Allahabad, Mirzapur, Benares, Ghazipur, Patna, and Monghyr, besides Calcutta on the Hooghli mouth. The principal mouths of the Ganges are the Hooghli, the most westerly, Meghna, the most easterly, Matla, Raimangal, Malancha, and Haringhata. The vast region embraced by the deltaic system is a flat alluvial tract of from 80 m. to 220 m. in breadth. The frontal region, or that part which fringes the ocean, is known as the Sunderbans, a mass of continually shifting mud banks intersected by navigable channels, and notoriously unhealthy. An immense amount of silt is carried in the water and deposited at the mouths, discoloring the sea for a distance of 50 m.

The Ganges forms, with its tributaries and the Gangetic system of canals, the greatest waterway communication and the largest irrigation system in India, the water-borne traffic to and from the numerous cities on its banks being prodigious. The valley is one of the most productive on the earth; it is everywhere cultivated, yielding rice, sugar, cotton, indigo, fruit, and opium.

At Benares, 740 m. upstream, the river has a width of 1,450 ft. in the dry months, nearly doubled in the wet season. At 500 m. from its mouth it is a mile wide. The period of flood begins in May and lasts until the end of July, the waters subsiding in Aug.-Sept. The river rises on the average 31 ft. and the country overflowed is about 100 m. in width. A tidal bore, most noticeable on the Hooghli, rushes up the river at nearly 18 m. an hour, sometimes causing an instantaneous rise of 5 ft. at Calcutta. The drainage area is estimated at 391,100 sq. m. See Allahabad; Benares.

**Gangi.** Town of Sicily, in the prov. of Palermo. It stands on a mt. slope, at an alt. of 3,000 ft., 19 m. S.E. of Cefalu. It has been identified with the ancient Enguim (Gr. Engyon), famed for its temple of the Great Mother of the Gods, despoiled by Verres. Pop. (1951) 10,381.

**Gangjam** OR GANJAM. District and town of India, in Orissa, formerly in Madras. The district lies on the coastline of the Bay of Bengal; area 7,688 sq. m. It is traversed by the E. Ghats, which here reach an alt. of nearly 5,000 ft. The chief products are rice, millet, and gram. Turmeric is grown for export. Among the industries are weaving and tanning, and there is trade in sugar and salt. Pop. (1951) 1,624,829. Gangjam town, at one time the headquarters of the district, declined in importance after it was superseded in 1815 by Berhampur.

**Ganglion** (Gr., tumour under the skin). Anatomically, a collection of nerve cells. Instances are the spinal ganglia on the posterior

roots of the spinal nerves, and the gasserian ganglion lying deep in the temporal region of the skull.

The term may describe a cyst-like swelling which forms in connexion with a tendon sheath or joint, most frequently involving the tendons at the back of the wrist or the fingers. It used to be treated by being struck a sharp blow which ruptured the cyst internally and led to absorption of the contents. Injection of sclerosing substances into the cyst is now preferred. See Brain; Nervous System.

**Gangpur.** Former state of India, in Orissa. The area of the state was 2,477 sq. m. The region is a long undulating tableland about 700 ft. above sea level, interspersed with hill ranges and isolated peaks. It is watered by the Ib, the Sankh, and the S. Koel, the last two uniting and forming the Brahmani. Gangpur was transferred from Chota Nagpur to Orissa in 1905, but in 1933 came into the Eastern States Agency, which became a residency in 1944. It was merged in the prov. (later state) of Orissa in 1948. The principal crops are rice, sugarcane, and oil-seeds, while coal, limestone, and iron are worked.

**Gangrene** (Gr. *gangraina*) OR MORTIFICATION. Death of a mass of tissue. The condition may be due to blocking of an artery which cuts off the supply of blood to a part (embolic gangrene); imperfect nutrition of a part in elderly people (senile gangrene); abnormal condition of the blood, as in diabetes, combined with a slight injury; chronic poisoning by ergot; Raynaud's disease (*q.v.*); injury to a limb (traumatic gangrene); infection by certain organisms (wound phagedena, hospital gangrene, gas gangrene, cancer oris, etc.); frost-bite; and burning. Clinically, gangrene is divided into two forms: dry gangrene, in which there is little fluid in the tissues and the part becomes dry, hard, shrunken, and black; and moist gangrene, in which the part is swollen with fluid and is putrescent. The chances of arrest of the progress, and recovery to health, as well as the treatment, depend upon the cause of the condition and the recuperative powers of the patient.

**Gangue** (Fr.). Term used in mining and geology to signify the useless minerals in an ore deposit. The term is not inflexible; e.g. barytes (barium sulphate) may be a useless mineral in a lead deposit but in certain circumstances

may be utilised as an ore of barium. Moreover values change, and what was once considered a gangue mineral may become an important ore mineral.

**Ganister.** Local name of a siliceous stone found in the lower coal measures of Yorkshire, particularly in the neighbourhood of Sheffield. It is a close-grained, dark-coloured, argillaceous sandstone rock, the clay being present in just about the necessary proportions to permit the stone, when ground and mixed with a little water, to be moulded into bricks. It is highly refractory and largely used for the lining of metallurgical furnaces of all kinds. See Blast Furnace; Dinas Rock; Furnace.

**Ganja** OR **GANJAH.** Name applied to the tops of cultivated female plants of *Cannabis sativa* or Indian hemp. The tops are cut directly after flowering and made into bundles from 2 ft. to 4 ft. long. The two varieties are Bengal and Bombay ganja, the superiority of the former being due to the care taken to eradicate the male plants from the fields where the tops are collected. Ganja is a narcotic and anodyne. See Hemp.

**Gannet** OR **SOLAN GOOSE** (*Sula*). Group of large sea fowl, rather goose-like in form, from which they derive their popular name. About 17 species are usually recognized, and they are widely distributed throughout the world. The European gannet (*S. bassana*) is common around the British coasts, and nests in vast numbers on the Bass Rock and the cliffs in many wild districts. It is almost 3 ft. in length, and has pure white plumage with the exception of some black feathers on the wings and a slight yellowish buff tinge on the head and neck.



Gannet. Unusual study of this large sea-bird alighting at its nest on a cliff

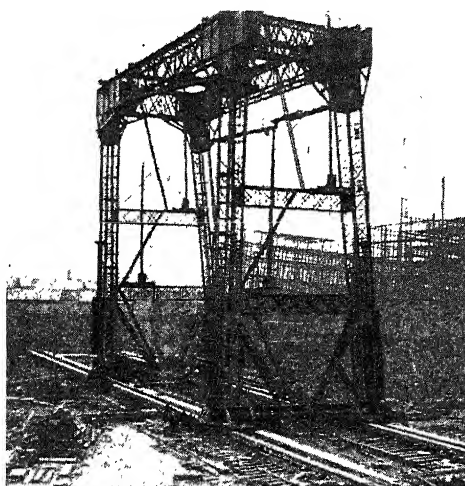
The birds assemble in great multitudes in the early spring at their nesting sites, and construct a small heap of seaweed and grass on the bare rock. Only one egg is laid, and the female sits so closely that she will often allow herself to be touched rather than leave the nest. She generally sits with her face turned towards the cliff. Gannets work havoc in the herring and pilchard fisheries, and their flesh is rank. See Grassholm.

**Ganoid.** Name applied to one kind of scale in fishes. Ganoids are bright bony structures. Many of the earlier fossil fishes had scales of this type, and the few still existing genera which have them in something like primitive form, include the sturgeon, American gar pike, bowfin, and pleyterus. The majority are fresh-water fish; some, like the sturgeon, attain a large size. The ganoids were formerly regarded by zoologists as forming a separate group from the Teleostei or bony fishes, but a more complete study of the fossil forms has shown so many intermediate types that the two groups are now classed as Actinopterygii, or pointed-finned ones. See Sturgeon.

**Gantang.** Mt. pass of India, in the Himachal Union. It leads over the Indian boundary into Tibet in lat. 31° 40' N. long. 78° 46' E., reaching an alt. of 18,295 ft. amid perpetual snow.

**Gantok.** Chief town of the Himalayan state of Sikkim. It stands among the mts. 40 m. N.E. of Darjeeling. The inhabitants are allied to the Tibetans.

**Gantry** (Lat. *cantherius*, trellis, framework). In engineering, a structure used for a variety of purposes, and generally of rolled steel sections. Gantries elevate grabbing locomotive cranes at coal yards. In the gantry crane in use on quays for unloading ships, giving high level operation for the crane with minimum obstruction at ground level, the gantry is so constructed as to allow rly. rolling stock and traffic to pass underneath the crane. It generally



Gantry. Shipyard hydraulic gantry in the process of being moved across the head of the slips  
Courtesy of "Mechanical Handling"

forms an integral part of the crane construction, the whole unit being usually mobile on rail tracks and often self-propelling.

Another gantry crane comprises two fixed and parallel frameworks on top of which travels a beam or girder, which in turn carries a mobile crane winch capable of travelling the length of the beam. This type is used in steel stock yards, engineering works, timber yards and power stations, where the need for full load operation over the whole area enclosed by the gantries and the reduced obstruction at ground level is of special importance. An adaptation, with travelling instead of fixed gantries, is the heavy "Goliath," capable of lifting 30 tons, and used for building breakwaters and harbours. Light gantries spanning trenches, travelling on crane rails and carrying chain blocks or tackle, are commonly used for laying large diameter pipes. In building work gantries of platforms supported by columns elevated above the pavements are adopted in restricted areas.

**Ganymedes** OR **GANYMEDE.** In Greek mythology, a Phrygian youth. He was carried off to heaven by an eagle, or by Zeus in the form of an eagle, to be the cup-bearer of Zeus at the celestial banquets. Later he was identified with the spirit of the sources of the Nile, and as such was placed by astronomers among the constellations as Aquarius or the water-carrier. He is usually represented with an eagle.

**Ganz,** **WILHELM** (1833-1914). German musician. Born at Mainz, Nov. 6, 1833, he belonged to a

musical family. In 1850 he settled in London, where he became accompanist to Jenny Lind, and during 1874-82 conducted the New Philharmonic and Ganz's orchestral concerts. He acted as accompanist to other great singers, and was professor of singing at the Guildhall School of Music. Ganz died Sept. 12, 1914.

**Gap.** Town of France, capital of the dept. of Hautes-Alpes. It stands on the Luye, 48 m. S.S.E. of Grenoble. It has a modern cathedral and in the prefecture is a valuable collection of manuscripts, as well as a museum. Another building is the bishop's palace. Gap has some small manufactures. It was a Roman settlement, and in the Middle Ages was chiefly famous as the seat of a powerful bishop. Pop. 16,371.

**Gapes.** Common disease in poultry affecting young chickens, in which it produces a heavy mortality. It is due to the presence of a worm, which is found sometimes in great numbers in the windpipe of the chicken, causing great irritation and weakness consequent upon efforts to expectorate the parasite. Actual suffocation may occur. The ground becomes infected by the eggs of the worm being scattered in all directions. The poultry are noticed to be gaping, sneezing, running backwards, and, finally, to be greatly exhausted. Attention should be paid to the food and water, and then to the affected ground. The chickens should be put upon a fresh run dressed with lime. See Poultry.

**Gaping Ghyll.** Largest pothole in England. The entrances to the two shafts are on the S. slopes of Ingleborough, in the W. Riding of Yorkshire. The main chamber, called the Hall of the Winds, is 500 ft. long, 82 ft. broad, and 20 ft. high, and lies 360 ft. below the level of the moor. Fell Beck falls into the chamber in twin cascades twice as high as Niagara, flowing thence by an uncharted underground course to Beck Head. Gaping Ghyll was first entered by

the main shaft in 1895, but not until 1935 was an entry made by the entrance known as the Rat Hole.

**Garabit.** Town of France in the dept. of Cantal. It is 81 m. by rly. S. of Clermont-Ferrand, and is known on account of the remarkable viaduct by which, near here, the railway crosses the Truyère. Built in 1881-84, this is 620 yds. long and 400 ft. high, with a central span of 540 ft.

**Garay, JUAN DE (1541-84).** Spanish soldier. Having settled in Paraguay, Garay attained a leading position there, and in 1573 founded the city of Santa Fé de Vera Cruz. As governor of Paraguay he conducted wars against the natives, and in 1580 founded Buenos Aires, on the site of the older settlement called Mendoza. He was killed by Indians.

**Garbett, CYRIL FORSTER (1875-1955).** A British prelate. He was born Feb. 6, 1875, and educated at Portsmouth grammar school, Keble College, Oxford, and Cuddesdon College. Ordained 1899, he was vicar of Portsea, 1909-19, and gained the reputation



Dr. Cyril Garbett,  
British prelate

of being an excellent administrator and trainer of junior clergy. He was appointed bishop of Southwark in 1919 and translated to Winchester in 1932. Here he began pastoral tours on foot, which took him throughout his diocese and

made him one of the best-loved bishops in England. On his translation to York as archbishop in 1942 he continued this practice of visiting the people. Garbett was clerk of the closet to the king, 1937-42. Among his publications were *A Call to Christians*, 1935; *The Church and Social Problems*, 1939; *Physician, Heal Thyself*, 1945. He died at York, Dec. 31, 1955.

**Garbo, GRETA.** Professional name of Greta Lovisa (Gustafsson) (b. 1906), Swedish-born American



Greta Garbo, Swedish-born American film actress

film actress. Born in Stockholm, Sept. 18, 1906, she made her debut in a picture which advertised hats sold by the store in which she worked. Her performance attracted the attention of Mauritz Stiller, who directed her in *The Atonement* of Gosta Berling, 1925. Her emotional and dramatic range, wistful melancholy, and beauty of unusual type ensured success, and she was put under contract to M.G.M. After such slight pictures as *The Temptress*, *The Mysterious Lady*, and *The Kiss*, she gave a memorable performance in *Anna Christie*, 1930, her first talking film, in which she enhanced her reputation by her deep, slow utterance. Later films included *Mata Hari*, 1932; *Queen Christina*, 1934; *The Painted Veil*, 1935; *Anna Karenina*, 1936; *Camille*, 1937; *Marie Walewska*, 1938. Films in a lighter vein were *Ninotchka*, 1939; *The Two-Faced Woman*, 1941. Garbo became a U.S. citizen in 1951. *Consult Life*, J. Bainbridge, 1955.

**Garborg, ARNE (1851-1924).** Norwegian author. Born Jan. 25, 1851, he was trained as a teacher, and in 1873 went to Christiania (Oslo) university. He became known as a critic, his essays, mostly on religious or ethical questions, being published in *Aftenbladet* and other papers. In 1877 he founded *Fedrahcimen*, a periodical published in dialect, which he edited until 1882. His first book, *A Year of Free-thought*, 1881, aroused great interest; it had previously appeared anonymously in *Fedrahcimen*. His dialect stories, *Peasant Students*, 1883; *Tales and Legends*, 1884; *Menfolk*, 1886; *At Home with Mother*, 1890; and *Weary Folk*, 1891, placed him in the front rank of Norwegian



Gaping Ghyll, Yorkshire. A descent of this great pothole being made in a bo'sun's chair

authors. Garborg, who also trans. the *Odyssey*, died Jan. 14, 1924.

**Garcia, CALIXTO** (1836-98). Cuban patriot. Born at Holguin, Oct. 14, 1836, he early took part in insurrections against Spanish rule. In 1880 he was captured, and imprisoned in Spain. In 1895 he escaped to Paris and thence to Cuba, where he at once joined in the rebellion then going on, and won several notable victories. In 1898 he commanded a body of his compatriots in the Spanish-American war, but died in Washington while on a mission to President McKinley, Dec. 11.

**Garcia, MANUEL DEL PÓPOLO VICENTE** (1775-1832). Spanish singer and composer. Born at



Manuel Garcia,  
Spanish singer

Seville, Jan. 22, 1775, he was a chorister in the cathedral there, and soon made himself known as composer, conductor, singer, and actor. In 1808 he became the leading tenor in the Italian opera in Paris, and in 1812 in the royal chapel at Naples. After singing in London and Paris he went to New York and Mexico. He opened a school of singing in London, and also taught in Paris. Garcia composed many operas, including *The Caliph of Bagdad*, 1812; and *The Death of Tasso*, 1821. He died June 2, 1832. His daughters, Mmes. Malibran and Viardot, became famous singers.

His son Manuel (1805-1906) was born March 17, 1805. A noted teacher of singing, for many years professor at the Royal Academy of Music, he made a scientific study of the vocal organs, one result being his invention of the laryngoscope. Jenny Lind was his pupil. He died July 1, 1906.

Manuel's son, Gustave (1837-1925), was born Feb. 1, 1837, and had a noted operatic career, making his début in Donizetti's *Don Sebastiano* at La Scala, in 1862. In 1880 he settled in England as a teacher, and was for some years professor at the R.A.M., and afterwards at the Royal College of Music and the Guildhall School of Music simultaneously. He retired in 1911 and died June 12, 1925.

Albert, his son (1875-1946), born Jan. 5, 1875, in London, also became professor at the R.C.M. and the Guildhall School, and had himself a fine baritone voice. He died Aug. 10, 1946.

**Garcilaso de la Vega** (1503-36). Spanish poet. A native of Toledo, he fought in the army of Charles V in Austria and Tunisia, and died at Nice from wounds received in action, Oct. 14, 1536. His poems, chiefly sonnets or eclogues written on Italian models, were highly esteemed and strongly influenced his generation. Cervantes called him the prince of poets. His works were translated into English by J. W. Wiffen, 1823; and J. Cleugh, 1930.

**Gard.** Dept. of France. In the S.E., it formed part of Languedoc. Its eastern boundary is the Rhône, and in the S. it borders the Mediterranean. Area, 3,270 sq. m. It consists of three districts, one covered by the Cévennes in the N., with beautiful mountain scenery and fruitful valleys; another called the Garrigues in the centre, where wheat, oats, the vine, and olives are grown; and a marshy region in the S. Other industries are the rearing of cattle, horses, and sheep, and the culture of silkworms. Minerals include salt obtained from the marshes. Quarrying and fishing are also carried on. Nîmes is the capital; other places are Alais and Aigues-Mortes, while Le Vigan, although small, is worthy of mention. The Pont du Gard is a Roman aqueduct crossing the Gard near Remoulins. The dept. takes its name from the Gard, or Gardon, a tributary of the Rhône;

other rivers are the Cèze and the Hérault. The dept. has three arrondissements. Pop. (1954) 396,742.

**Gard, ROGER MARTIN DU** (b. 1881). French author, born March 23, 1881, in Paris. One of the outstanding representatives of 20th-century French literature, he won the Nobel prize for literature in 1937. He first attracted attention by a novel, *Jean Barois*, 1913, inspired by the Dreyfus case; his masterpiece is *Les Thibault*, 1921. Numerous essays and a few comedies were interspersed among du Gard's carefully written novels, on each of which he spent three to five years, living in seclusion in a castle in Normandy.

**Garda, LAGO DI** (Lat. Lacus Benâcus). Lake of Italy. It is the easternmost and largest of the Italian lakes, and lies between Lombardy and Veneto, running into Trentino-Alto Adige. Some 34 m. long and from 3 m. to 10 m. broad, with a maximum depth of 1,900 ft., it has an area of about 180 sq. m. It is fed by the Sarca and drained by the Mincio. Mountainous on the N. and E., the shores slope gently to the S., and on the W. figs and grapes flourish. This part, called La Riviera, is lined with charming villas. The beautiful promontory of Sirmione, on the S. shore between Peschiera and Desenzano, has many remains of Roman and later buildings.

## GARDEN AND GARDENING

*The information given herein is supplemented by the articles on the various flowers and plants grown in gardens, e.g. Dahlia, Gardenia; Flower; Lobelia; Rose. The growing of vegetables is discussed under Allotment; Kitchen Garden. See also Annuals; Greenhouse; Market Gardening*

Garden comes from a Teutonic word meaning an enclosure, and is akin to the less familiar garth. Its present meaning is that of a piece of enclosed ground, wherein flowers shrubs, fruit, and vegetables are grown. There are two main divisions of gardens, ornamental and useful, many of the latter being known as market gardens. Ornamental or flower gardens are classified according to the way in which they are laid out, e.g. in the Dutch or Italian style, or according to what flowers and shrubs they contain, e.g. a rose garden. Public places of amusement, ornamented with flowers and shrubs, are sometimes called gardens, e.g. the old Cremorne Gardens in London, and there are zoological gardens and botanical gardens.

Gardening is the practice and development of plant cultivation

which results in the production of the best and choicest forms of flowers, fruit, and vegetables. According to Strabo, the first systematic attempts at horticulture in Britain were due to the Romans. Probably, however, the so-called gardens were merely patches of ground cleared and cultivated with fruits and vegetables, in which little attempt at floriculture, or colour effect, was made.

The first park in England was made by Henry I, at Woodstock, but progress was slow, despite the fact that there was no lack of material. A writer of the 12th century thus describes the desirable contents of a garden. "It should be adorned on this side with roses, lilies, and the marigold; on that side with parsley, cost, fennel, southernwood, coriander, sage, savary, hyssop, mint, vine,



dettany, pellitory, lettuce, cresses, and the peony. Let there be beds enriched with onions, leeks, garlic, mellons, and scallions. The garden is also enriched by the cucumber, the soporiferous poppy, and the daffodil, and the acanthus. Nor let potherbs be wanting, as beetroot, sorrel, and mallow. It is useful also to the gardener to have anise, mustard, and wormwood. A noble garden will give you medlars, quinces, the pearmain, peaches, pears of St. Regle, pomegranates, citrons, oranges, almonds, dates, and figs." Many of the subjects are unidentifiable with the familiar flowers and fruits known by their name today.

Until the 16th century, most of the practical horticulture of Britain was in the hands of the monks, who were chiefly concerned with the culture of fruit and vegetables for the table, and of medicinal herbs, rather than of flowers. In 1510 the earl of Northumberland, in an establishment of over 150 persons, boasted only one gardener, who was paid by the hour. Gardening made rapid strides in the latter half of the 16th century, and the Tudor gardens of that period, blended with the Dutch introduction of a century later, form, perhaps, the basis of modern horticulture. The Dutch, or formal, style of garden was much in evidence until the mid-Victorian era, when William Robinson and other practical gardeners started a vigorous campaign in favour of a less restrained and more natural arrangement of trees, shrubs, and flowers. The ultimate result has been a modification in the art of garden planning.

#### Considerations of Expense

The change has quickened since the Second Great War, as shortage and high cost of labour have made it necessary to reduce the charges of maintenance. Gardeners' wages have doubled, and plants are much more costly. Therefore the informal garden, less expensive to maintain than the formal, is more popular, particularly in large places where labour has been reduced. Economy in maintenance is a controlling factor in present-day garden design.

A plan that suits the average plot of ground, from one acre upwards in extent, is to have a fairly large lawn unbroken by flower beds, extending from the house for some distance, and merging into a grassy glade between plantations of ornamental trees and flowering shrubs. The use of a motor mower saves much time and

labour. Trees and shrubs need little attention beyond an annual pruning. Part of the garden might be planted as a woodland which can be made attractive with rhododendrons, lilies, and spring-flowering bulbs in the spaces among the trees. If room elsewhere be found for an herbaceous border, and plots are devoted to roses, rock and water plants, fruits, and vegetables, the garden will be representative of all that is best in modern practice.

During the 20th century numbers of trees, shrubs, and plants, new to gardens in Great Britain, have been introduced from China, Tibet, Burma, and other parts; their cultivation has brought about great changes. The tendency is to rely chiefly on those plants and shrubs which need the minimum of care once planted. Hence the popularity of the woodland garden in large country places; it might well be made a feature of smaller gardens. Within its shelter numerous exotic shrubs and plants can be grown to perfection with small expenditure of labour.

#### Woodland Plants

Rhododendrons and azaleas are ideal for planting where the shade is not dense. Of those introduced from the Far East, many are spring-flowering, and, together with the familiar large-flowered hybrids or varieties, will keep the woodland bright with blossom for months. The early flowering kinds must have shelter from spring frosts. Bulbous plants flourish in woodland—anemone, lily, hardy cyclamen, meadow saffron, bluebell, star of Bethlehem, snowdrop, winter aconite, and, if they are planted in open spaces, daffodil and narcissus. In the moister places, hardy primulas and those spiraea-like plants, the astilbes, will thrive. Other good woodland plants are Christmas and Lenten roses or hellebores, the tall bell-flowers or campanulas, mullein or *Verbascum*, golden rod, Solomon's seal, hardy geraniums, the tree heaths, broom or cytisus, columbine, primrose, and polyanthus. Most of these flourish in an acid soil, i.e. one that contains little or no lime; the woodland soil consists largely of leaf mould.

Specialisation in the cultivation of one or more plants is common practice. This cult has been fostered by special societies which, by exhibitions, discussions, lectures, and printed matter, further the interests of the flowers with which they are concerned. Thus there are the Rhododendron Associa-

tion, Iris Society, Alpine Garden Society, Royal Horticultural Society's lily group, etc. New varieties are often lost to cultivation because of some defect which makes them unsuitable for the average garden; the best remain and are listed in the catalogues of the nurserymen. It is only by choosing the finest varieties that the owner of a garden can cultivate his plot to full advantage; they are not more difficult to manage than the older and inferior sorts and they are superior in size of bloom, brilliance or charm of colouring, length of flowering season, and vigour of growth.

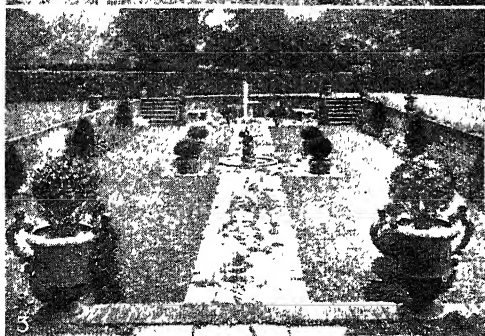
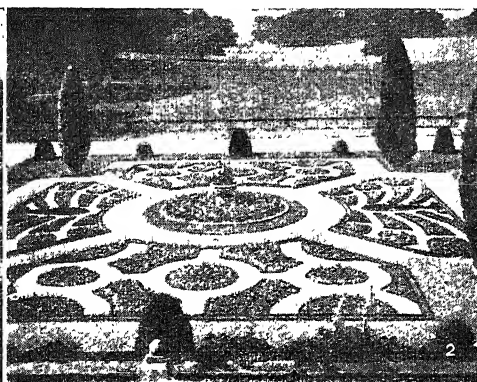
#### New and Improved Varieties

There are now greatly improved varieties of delphinium, lupin, iris, sweet pea, poppy, rock garden flowers, phlox, rose, dahlia, and chrysanthemum. Most have been raised by cross-breeding and selection in home gardens and nurseries, but new plants have also been discovered by botanical explorers and introduced to gardens. New fruits and vegetables have been made available, their cultivation being more profitable than that of the old-fashioned sorts.

#### THE HERBACEOUS BORDER.

This is one of the principal features of the modern garden, furnishing a brilliant display throughout the summer. It is successful only if, before the plants are put in, the ground is trenched 2 ft. deep and enriched with stable manure, hop manure, or material from the compost heap. The plants used chiefly are herbaceous perennials, so called because the root-stocks are perennial and live on from year to year while the top growth dies down annually. The finest show is obtained by setting the plants in groups of irregular shape, one group being arranged so that it merges naturally into the adjoining one; that cannot be done if the plants are set in squares, circles, or lines. In a long border each group should consist of at least a dozen plants; about seven to a group suffice in a shorter border. They should be arranged according to the height they will reach and the colour of the flowers. The tallest plants are set at the back of the border. If the groups are of irregular shape, the border will have a natural appearance, for different plants of the same height vary greatly.

Gertrude Jekyll, the famous artist-gardener, pointed out the need for grouping according to colours, and the method she described is often practised. The



1. Herbaceous border in the kitchen garden, Balls Park, Hertford. 2. Formal variegated flower-beds at Althorp Park, Northamptonshire. 3. Sunk garden with paved walk and fountain, Hanover Lodge, Regent's Park, London. 4. Rock garden with water pools, Friar Park, Henley. 5. Flower garden with clipped hedge enclosure, Aldenham House, Herts

**GARDEN: DOMESTIC AND LANDSCAPE STYLES OF BRITISH GARDENS**

white and pale flowers, those of light blue, light yellow, and pink are used at one end of the border; these are followed by those of rose, salmon, blue, carmine, and mauve, which again lead on to the most brilliant of all—scarlet, crimson, orange, and yellow. In this way the colour scheme is worked up from the palest flowers at one end to the most richly coloured at the other.

Although the herbaceous border is filled chiefly with perennials, a few other plants can fill blank spaces and add to the brilliance of the display. Among them are gladiolus, antirrhinum, aster, dahlia, anchusa, Canterbury bell, sweet william, and hardy annuals, *e.g.* larkspur, godetia, cornflower, clarkia. The soil must be kept weed-free by hoeing frequently. Those plants needing support must be staked in good time to keep the flowering stems erect. The herbaceous border will be in full splendour in July, but some flowers open in June and others delay until early Sept.

#### Plants for Mixed Borders

A variant of the herbaceous border, called the mixed border, entails less maintenance. Besides some favourite herbaceous perennials, *e.g.* delphinium, lupin, peony, helenium, purple sage, scarlet lychnis, bellflower, coreopsis, galega, and phlox, it is planted also with suitable shrubs. Such a border needs less tending than one devoted wholly to flowering plants, but does not provide such a brilliant show of bloom. Only shrubs of moderate vigour will serve; it is impossible to grow herbaceous plants near large shrubs whose roots impoverish the soil. Suitable are cytisus or broom, *Daphne mezereum*, the smaller kinds of *berberis*, and especially the purple-leaved one named *Thunbergii* *atropurpurea*, shrubby *spiraea*s, *deutzia*, *genista aetnensis*, *potentilla Farreri*, *potentilla Vilmoriniana*, *ceanothus Ceres*, and *Gloire de Versailles*, and the smaller shrub roses. If the soil contains little lime, *rhododendron*, *azalea*, *pernettya*, and heather can also be planted. Room can be found for some of the taller bulbous plants, *e.g.* lilies, *galtonia*, *gladiolus*, and for such ornamental plants as plume poppy (*bocconia*), *yucca*, *spiraea aruncus*, pampas grass, and red-hot poker. Rose bushes may be used, particularly those of the cluster or hybrid *polyantha* type.

**THE ROCK AND WALL GARDEN.** The cultivation of alpine plants in

a rock garden is a fascinating recreation. A number of low-growing plants which are not true alpinines are included in most collections. Although a few kinds spread quickly and take up a great deal of room, most rock plants are miniatures. They are not difficult to manage providing they are set in soil which is thoroughly drained; most thrive better on sloping ground than on the flat. Those native to the high alpine districts are the most difficult to grow successfully in lowland gardens; they probably flourish naturally in a moraine which consists chiefly of stones and gritty material.

#### Making a Rock Garden

It is not easy to grow a rock garden which looks natural. Successful results are most likely with stone or rock-limestone or sandstone in large blocks. Miniature cliffs of long narrow rocks placed against mounds of soil give variety of contour and the spaces between them provide ideal positions for the silvery saxifrages and other rock-loving plants, which should be set with their leaves flat against the cliff. Between the cliff-like formations there will be rock-strewn slopes which make a fitting home for numerous rock plants. At least half of each stone should be covered with soil. So many rock gardens look ridiculous because they consist of mounds of soil in which large stones are slightly embedded. The dry wall, *i.e.* a wall in which soil instead of cement mortar is used, makes an admirable adjunct to the rock garden. Flat, or walling, stones are used; each layer should be set slightly farther back than the previous one. Between one layer of stone and the next there should be 2 ins. or so of soil for the sustenance of the plants. If possible the plants should be put in as the building is done, which is a more convenient practice than scooping out soil from between the stones and inserting plants after the building is finished.

**THE FORMAL GARDEN.** This now usually consists of flower beds of simple design intersected by paved paths set on cement. York stone is the best material for the paths, as it weathers beautifully, but cement, in pre-cast slabs or mixed and shaped on the site, is used to reduce the expense. It is an advantage to have the paths slightly higher than the flower beds. Such a garden, surrounded by a yew hedge and containing a sundial or bird bath, might well be filled

with sweet williams, lilies, tulips, daffodils, poppies, anemones, Iceland poppies, fragrant stocks, catmint, old-fashioned roses, carnations, pinks, pansies, violas, marigolds, irises, bellflowers, the low growing Michaelmas daisies, and the Japanese stonecrop which attracts butterflies and bees. Such a garden is far more economical of labour than one filled with bulbs for spring and with geraniums, fuchsias, and other tender bedding plants for summer. Bedding out is not often practised except in large places where flower beds of formal shape near the house have to be filled, in public parks and gardens, and in small gardens containing only a few beds.

#### The Water Garden

This easily established feature affords a great deal of interest and pleasure. There are miniature water-lilies suitable for planting in the smallest pools and in water only 12–18 ins. deep; those which spread quickly and eventually cover wide spaces are used only in large ponds. Other water plants in great variety are available, among them those oxygenating plants which are necessary to keep the water clean for ornamental fishes. Moist soil by the side of the pool provides a suitable home for iris, astilbe, *spirea*, musk, hog primula, the royal and other ferns, loosestrife, etc. This is an ideal place for the brilliantly coloured Japanese irises which like their roots in damp soil and their flowering stems in sunshine. The water garden must be in a sunny place.

**GARDENING AS A PROFESSION.** During the past generation the gardens attached to country mansions have been no longer maintained in their former splendour. Yet gardening as a recreation of the people has increased enormously. There are no finer small gardens in the world than the British. The village flower show holds its own, and almost every rural and provincial district has its horticultural society. Great flower shows, at Chelsea, Shrewsbury, Southport, and Edinburgh, attract large crowds who see all the modern forms of gardening as well as the popular plants and flowers.

Market gardening both under glass and out of doors has become an industry employing thousands, for, as the towns increase in size, so the demand grows for fresh vegetables, fruit, and flowers. Gardeners' wages have risen, since horticultural tools and implements

cost more than they used to. Though the number of professional gardeners on large estates has decreased, there are more plant nurserymen, growers of market produce, and jobbing gardeners. Those who wish to take up gardening to earn a living should specialise; they should grow vegetables, fruit, or flowers for market, undertake the management of private gardens, start nursery gardens, or set up as jobbing gardeners working by the day. But none of these jobs should be undertaken without several years' training. There are openings for teachers of horticulture, park superintendents, and other posts in municipal gardening, and as instructors to the county councils. To qualify for these posts it is necessary to obtain the national diploma in horticulture of the Royal Horticultural Society. Training facilities are afforded by Kew, the Wisley Gardens of the R.H.S., and Reading university. Women may fill posts as head gardeners, and are employed in nurseries, florists' shops, and experimental stations.

**Bibliography.** Popular Encyclopedia of Gardening, ed. H. H. Thomas, 1933; Garden Design of Today, P. Cane, 1934; Rock Garden Plants, C. Elliott, 1935.

**Garden City.** Industrial or residential town in which overcrowding is avoided by the planned lay-out and spacing of buildings so that residents enjoy the amenities and conveniences of a city with the benefits of country life. The garden city was the first serious attempt in England to restore space and health to the worker's living conditions after the Industrial Revolution.

In 1898 Sir Ebenezer Howard advocated that manufacturers by acquiring tracts of suitable land might establish themselves and their employees under more healthy and economical conditions. Although not well received by most industrialists, Howard's theories were accepted by sociologists, and in 1899 the Garden Cities and Town Planning Association was formed. In 1903 the first English garden city was registered as a limited company with a capital of £300,000. Land was acquired at Letchworth, Herts, where a town was built, designed for healthy living and industry, and surrounded by a rural belt, the land being held in trust for the community.

Today there are some 50 factories at Letchworth, all within easy reach of the workers, who

have good houses with adequate sunlight, gardens and allotments; shops, schools, factories, and cinemas are built on modern hygienic principles.

Letchworth was followed by Welwyn garden city (1920), Hampstead garden suburb, and others throughout England and Scotland. Similar to the garden city are the settlements at Bournville and Earswick, promoted respectively by the firms of Cadbury and Rowntree and now administered by trusts having the status of public utility societies. Port Sunlight differs in being reserved for employees of Lever Brothers and lacking gardens.

The success of the garden city led to the Town Planning Act of 1909, the legislation against "ribbon" development, and the clearing of existing slum areas and the transfer of their populations to satellite "garden city" areas. France, Belgium, Germany, Austria, Spain, Poland, and the British dominions followed the British lead, and the International Garden Cities and Town Planning Association, which was formed in 1914, has members in every country. See Satellite Town; Town Planning; Zoning; consult also The Garden City, C. B. Purdom, 1913; Country Towns in the Future England, S. Baron, 1945.

**Gardeners' Company.** Livery company of the City of London incorporated by royal charters in 1605 and 1616. Its motto is In the Sweat of Thy Brows Shalt Thou Eat Thy Bread (Gen. 3, v. 19). Its offices are at 117a, Cheapside, E.C.2. Consult Histories of the Company, C. Welch, 1900; T. Crossweller, 1908.

**Gardenia.** Genus of evergreen trees and shrubs. Of the family Rubiaceae, they are natives of tropical Asia and S. Africa. They have opposite leaves, and sweet-scented, white, funnel-shaped or salver-shaped flowers. The so-called Cape Jessamine (*G. florida*) is really a native of China.

**Garde Républicaine.** Force organized by decrees of July 5, 1848, and Feb. 1, 1849, as an integral portion of the national gendarmerie for police duty in Paris. Officially styled the Légion de la Garde Républicaine, it is a military organization of approximately 3,000 men, in 12 companies of infantry and 4 squadrons of cavalry, under the control of a colonel or commandant, and placed as a supplementary guard at the disposal of the prefect of police. The members of the force, all ex-soldiers,

wear a striking uniform and are armed with long swords. Under the direct control of the prefect, the legion guards the public buildings and offices, controls the traffic at certain points, and handles the crowds on holiday occasions, while always acting as a reserve force which can be brought to the relief of the regular police in emergency.

**Gardiner, ALFRED GEORGE** (1865-1946). A British journalist and essayist. He was born at Chelmsford, June 2, 1865, became a journalist on The Essex County Chronicle, and was editor of The Daily News, 1902-19, giving a Radical direction to its policy. He wrote several books of character sketches, including Prophets, Priests and Kings, 1908; Pillars of Society, 1913; and Lives of Sir William Harcourt, and George Cadbury, both 1923. Under the pen-name Alpha of the Plough, he wrote in The Star discursive essays, collected as Pebbles on the Shore, 1917; Leaves in the Wind, 1918. He died at Princes Risborough, March 3, 1946.

**Gardiner, JOHN STANLEY** (1872-1946). A British zoologist. Born at Belfast, Jan. 24, 1872, he was educated at Marlborough and Caius College, Cambridge. As a zoologist he took part in numerous expeditions to various parts of the world between 1896 and 1908. Chiefly concerning himself with marine biology, he was professor of zoology and comparative anatomy at Cambridge, 1909-37, and was trustee of the British Museum from 1931. He published Coral Reefs and Atolls, 1931. He died Feb. 28, 1946.

**Gardiner, SAMUEL RAWSON** (1829-1902). A British historian. Born at Ropley, Hants, March 4,



Samuel R. Gardiner,  
British historian  
Elliott & Fry

1829, he was educated at Winchester and Christ Church, Oxford. Beyond a professorship at King's College, London, he held no tutorial positions, and gave his life to historical studies. The period to which he devoted himself was that of the Civil War, and the Commonwealth, on which he was the supreme authority.

In ten volumes Gardiner wrote the History of England from the Accession of James I to the outbreak of Civil War, 1883-84; in three others he narrated the History of the Great Civil War, 1886-

91; and wrote three volumes on the History of the Commonwealth and Protectorate, 1894-1903; but did not live to complete the fourth. He collected and edited Constitutional Documents of the Puritan Revolution, 1889; wrote What Gunpowder Plot Was, 1897; Oliver Cromwell, 1899; A Student's History of England, 1890-91, new ed. taking the work down to 1910. In 1894 he declined an appointment as professor of history at Oxford. He died at Sevenoaks, Feb. 14, 1902.

**Gardiner, STEPHEN** (c. 1493-1555) English prelate and statesman. Son of a Bury St. Edmunds cloth worker, he was educated at Trinity Hall, Cambridge, of which he was elected master in 1525. In 1528 he was sent by Henry VIII to Rome to conduct negotiations for his divorce



Stephen Gardiner.  
English prelate

from Catherine of Aragon, in 1529 became secretary of state, in 1531 was appointed bishop of Winchester, and in 1540 was elected chancellor of Cambridge University. His vindication of Henry's title as supreme head of the church was undertaken in 1535. Under Edward VI he spent over five years in prison for his opposition to doctrinal changes and was deprived of his see, but on Mary's accession he was restored and made lord chancellor. His actual responsibility in the persecution of Protestants is uncertain, but no one was burnt for heresy in Winchester diocese while Gardiner lived. He died in London, Nov. 12, 1555, and was buried in Winchester cathedral. J. A. Muller wrote his Life, 1926, and edited his Letters, 1933.

**Gardner, ERNEST ARTHUR** (1862-1939). British archaeologist. Born in London, younger brother of Percy Gardner, he was educated at the City of London school and Caius College, Cambridge. After excavating at Naukratis, Egypt, 1885-86, he was director of the British school at Athens, 1887-95, conducting excavations at Paphos and Megalopolis. Appointed Yates professor of archaeology, University College, London, in 1896, he remained until 1929, being also public orator to the university, 1910-32, and vice-chancellor, 1924-26. He served at Salonica, 1915-17. Among many

publications are his Ancient Athens, 1902; Six Greek Sculptors, 1910; Religion and Art in Ancient Greece, 1910; A Handbook of Greek Sculpture, rev. ed. 1915; The Art of Greece, 1925; Greece and the Aegean, 1933. He died Nov. 27, 1939.

**Gardner, PERCY** (1846-1937). A British archaeologist. Born at Hackney, Nov. 24, 1846, he was educated at the City of London school and Christ's College, Cambridge. Entering the British Museum in 1871, he produced several coin catalogues. In 1880 he became Disney professor of archaeology at Cambridge, and during 1887-1925 was professor of classical archaeology at Oxford. He edited the Journal of Hellenic Studies, 1880-96. His many works include Types of Greek Coins, 1883; Manual of Greek Antiquities, 2nd ed., 1898; Grammar of Greek Art, 1905; Greek Art 1926. Another of his interests is exemplified by his Jowett lectures, Historic View of the New Testament, 1901; and Religious Experience of St. Paul, 1911. He died July 17, 1937.

**Gardone Riviera.** Name of a series of eight villages of N. Italy. On the W. shore of Lago di Garda, they form a winter resort for consumptives and a spring and autumn one for invalids.

**Gare Fowl.** Common alternative name for the great auk. It is the anglicized form of the Icelandic geirfugl. See Auk.

**Gareloch.** Arm of the Firth of Clyde, Dunbartonshire, Scotland. It extends about 7 m. N.W. from Helensburgh. After the collapse of France in the Second Great War had virtually closed the ports of southern England, work was begun on the Gareloch at the end of 1940, and the first ship was berthed there in July, 1942. The new port, called Faslane, covered 1½ m. of waterfront and had six rail-served berths 500 ft. long. A large tonnage of U.S. military stores and vehicles was received here and dispatched to the Continent.

**Gareth, SIR.** Character in the Arthurian legends. Youngest son of King Lot and brother of Gawain and Mordred, he entered the court of his uncle, Arthur, concealing his identity at his mother's request. He received a knighthood and, at the request of Liones (whom he afterwards married) to escape from castle Perilous.

**Garfield.** City of New Jersey, U.S.A., in Bergen Co. On the Passaic and Saddle rivers, 10 m.

N.W. of New York, it is served by the Erie rly. The manufactures are textiles, clothing, chemicals, paper and rubber products, printing presses, and hardware. A borough 1898, Garfield was made a city 1920. Pop. (1950) 27,550.

**Garfield, JAMES ABRAHAM** (1831-81). President of the U.S.A. Born at Orange, Ohio, Nov. 19, 1831, in humble circumstances, and soon left fatherless, he worked as a labourer as soon as he was old enough. A desire for education seized him, and about 1849 he managed to enter a college at Chester, Ohio. He studied there and elsewhere for about six years, and in 1856 was made lecturer at Hiram College. In 1857 he was chosen its president and in 1861 he became a barrister. During the Civil War he commanded an infantry brigade at Shiloh and elsewhere, and, as chief of the staff to Rosecrans, distinguished himself at the battle of Chickamauga.

*James Garfield*

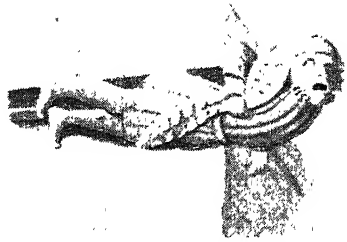
As a Republican he began his active political career in 1856. State senator of Ohio, 1859, he was elected to the house of representatives at Washington in 1863. He assisted Lincoln in the last difficult days of the Civil War, and was prominent during the next 18 years, being chairman of the military committee, and a frequent speaker on financial and other matters. He was three times candidate for the office of speaker, and in 1880 was nominated by the Republicans for president, being elected against W. S. Hancock.

During his brief term of office Garfield showed want of tact in dealing with political opponents, and by selecting his cabinet almost entirely from his own section of the Republican party, incurred the hostility of the "stalwarts," or supporters of Grant, led by Roscoe Conkling, who resigned their places in the senate. He was shot at Washington railway station, July 2, 1881, but survived until Sept. 19, when he died at Elberon, N.J. His assassin, who was hanged, was Charles J. Guiteau, a Chicago lawyer who had asked for, but failed to obtain, the American consulship at Marseilles. Garfield's monument is at Cleveland.

*Bibliography.* Life, Speeches, and Public Services, R. H. Conwell, 1881; Works, ed. B. A. Hinsdale,

2 vols., 1882-83 : Garfield's Place in History. H. C. Pedder. 1882 : Reminiscences of J. A. Garfield, C. E. Fuller, 1887 : From Log-Cabin to White House, W. M. Thayer, repr. 1914 : Life and Letters, T. C. Smith, 2 vols., 1926.

**Gar-fish** (*Rhynchostoma belonti*). Group of fishes of long and slender form. They have the jaws produced to form a sword-like beak, with rough edge and widely set teeth, and bones of a green colour. They are marine in habit,



Gargoyle. Examples in church architecture : left, at Stony Stratford, Buckinghamshire ; right, at Horsley, Derbyshire

and include about fifty species, of which one is quite common around the British coasts.



Gar-fish. Slender fish with prolonged sword-like jaws

**Garganey** (*Anas querquedula*). Species of wild duck similar to the teal (*q.v.*). It is found in most parts of Europe and Asia during the summer, and in winter around the Mediterranean and in Southern Asia. An extremely rapid flyer, it visits Great Britain in the spring, and nests in dense clumps of rushes.

**Gargano** (anc. Garganus Mons). Mountainous peninsula of S.E. Italy, in the prov. of Foggia. Jutting out some 30 m. into the Adriatic, it rises, in Monte Calvo, to an alt. of 3,464 ft.

**Gargantua**. Central figure of Rabelais's *Les Horribles Faictz et Prouesses Espouventables de Pantagruel*, published under the pseudonym Alcofribas in 1535. Gargantua, father of Pantagruel, is a huge giant with a vast capacity for eating and drinking. From his name is derived the adjective gargantuan to denote anything prodigiously large. See Rabelais.

**Gargles** or **GARGARISMA**. Fluid preparations used in medicine for medicating the throat by taking a mouthful of the liquid, throwing

the head back, and gently breathing air through it. They are employed chiefly in conditions of catarrh and inflammation of the throat. If the inflammation is acute, the action of gargling should be gentle. Gargle is from Fr. *gargariller*, to gargle ; *gargarisma* is a Latin word meaning a gargle, Fr. *gargarisme*.

**Gargoyle** (Fr. *gargoille*, throat). Projecting spout attached to the gutter of a roof for shooting rain-

water clear of the walls. In Gothic architecture it was made of stone fashioned into a grotesque animal or human face. The term can be used of an ordinary lead trough or rain-water head.

**Garhmuktesar**. Town of the Uttar Union, India, in the Hapur subdivision of Meerut dist. It contains the great temple of Mukteswara Mahadeo, from which its name is derived, and is one of the chief resorts of pilgrims, being on the Ganges. There are also a mosque, built in 1283, and an ancient fort. Pop. 5,950.

**Garhwal**. District of the Uttar Union, India, in the Kumaun div. Its area is 5,629 sq. m. It lies in the Himalayas. The cultivated area is small, and is principally devoted to rice, wheat, and other grain crops. The chief trade is with Tibet. Exports consist of grain, cloth, ghi, and chillies, and imports salt, wool, sheep, and goats. The district contains a number of shrines held sacred by the Hindus, among them the temples of Badrinath, Kedarnath, and Pandukeshwar, which attract pilgrims. Pop. (1951) 639,625.

**Garian** or **GURIAN**. Ancient Berber stronghold of Libya, N. Africa, 50 m. S. of Tripoli, on the crest of the Gebel Nefusa escarpment. On an ancient caravan route, it has many remarkable so-called Troglodyte dwellings, which are in fact underground houses in pits dug out of the hard red clay of the district. Tobacco is grown around Garian.

**Garibaldi**, GIUSEPPE (1807-82). Italian patriot. A fisherman's son, he was born at Nice, July 4, 1807. In 1834 he flung himself ardently into the Young Italy movement, initiated by Mazzini, joined in an insurrection, and barely escaped from the country with his life.



Giuseppe Garibaldi, Italian patriot. From a photo c. 1860

During 1836-48 he was in S. America, where he won high reputation as a leader both on land and on sea, fighting for the Montevideans against Rosas, dictator of Buenos Aires. In 1848, when oppressed peoples were everywhere rising against their rulers, he returned to Italy, raised troops of volunteers, whom he inspired with his own heroic courage and passionate love of liberty, and performed brilliant feats of arms in the defence of the Roman republic. But the insurrection collapsed, and in 1849 he took refuge in New York. His Creole wife Anita had died during the campaign. In 1854 he again returned, settling in Caprera under the Sardinian government.

On the outbreak of the war in 1859 between Austria and Sardinia (*i.e.* Victor Emmanuel), supported by Napoleon III, Garibaldi rendered brilliant service to the Italian cause. But when Napoleon, after the victory of Solferino (June 24), imposed the peace of Villafranca, and Nice, to Garibaldi's deep chagrin, had been handed over to France, he lent his unique genius as a partisan leader to the Sicilian insurgents against the Bourbon monarchy of Naples. Openly discountenanced but secretly encouraged by Cavour, he gathered an army of 1,070 volunteers, his "red shirts," known as Garibaldi's Thousand, sailed from Genoa on May 5, 1860, threw himself into Sicily, and cleared it of the 20,000 Bourbon regular troops. Passing over into Italy, Aug. 8, he conducted what was in effect a triumphal march to Naples, whence Francis II took flight. When Victor Emmanuel entered Neapolitan territory, Garibaldi hailed him as king of united Italy, Nov. 7.

This conclusion to his epic showed that Garibaldi could rise to statesmanship. Later he was carried away by impetuosity, though his adventures in the cause of liberty were not ended. Believing



his project to be favoured by the king, he attempted, in 1862, to wrest Rome from the pope; but the Italian government turned against him, and he was hopelessly defeated at Aspromonte, Aug. 29. He again commanded the irregular troops he loved in the war with Austria, 1866; and in 1867, in defiance of his government, again tried to capture Rome, but was disastrously defeated by its French defenders at Mentana, Nov. 3. He was again permitted to go into retirement, but the Franco-Prussian War roused him once more, and, when France had discarded the emperor, he gave his services to the French army in the Vosges, 1870. The remaining years of his life he passed as an invalid in his home at Caprera, where he died June 2, 1882.

In 1864 Garibaldi paid his one visit to England, where he was welcomed with immense enthusiasm. His autobiography appeared in Eng. trans., 1889; his Memoirs, ed. A. Dumas, Eng. trans. R. S. Garnett, in 1931. G. M. Trevelyan's trilogy, repr. as Garibaldi, 1933, has superseded all earlier works in English for the period 1848-60.

**Gariep.** Variant name for the river of S. Africa better known as the Orange (*q.v.*).

**Garigliano** (anc. Liris). River of S. Italy. Rising in the Apennines, W. of Lake Fucino, it flows, as the Liri, S. past Sora, and thence to the Gulf of Gaeta. Its length is 104 m. Navigable below Pontecorvo, it abounds in fish. The Allies had to fight hard, Dec., 1943-Jan., 1944, to cross the Garigliano. Its tributary the Rapido, flowing below Cassino, was one of the obstacles the Allies had to overcome in their attack on that lofty stronghold.

**Garlic.** Pungent flavoured bulbs of the onion family, of the family Liliaceae, genus *Allium*. A native of the East, probably S.W. Siberia, garlic grows to a height of 2 ft., bearing at the top an umbel of a few whitish flowers mixed with a number of small bulbs. The plant is cultivated in similar way to the shallot, and only the bulb part is eaten. It has a powerful onion-like smell and taste, and is used as a condiment chiefly in S. Europe. The allyl



Garlic. Flowers and foliage of *Allium oleraceum*

sulphide found in garlic is reputed to be a cure for consumption.

Wild garlic, *Allium oleraceum*, is occasionally used in England as a pot-herb. Another species, *Allium vineale*, the field garlic or wild onion of America, grows extensively in the pasture lands of U.S.A., and gives a disagreeable flavour to milk, butter, and cheese when eaten by cattle. This species

also grows in English meadows.

#### **Garmisch - Partenkirchen.**

Twin towns in Upper Bavaria, at the foot of Germany's highest mountain, the Zugspitze. Situated at a height of 2,140 ft., they are a centre for winter sports, and a health resort reputed for a sunny, sheltered situation in the Partnach valley. Here were held the Olympic winter sports contests of 1935-36. Neighbouring Kainzenbad is a spa for rheumatic and women's diseases. Excursions by cable rly. to the summit of the Wank and the Zugspitze (9,718 ft.) permit views of a beautiful Alpine panorama. Pop. 10,107.

**Garnet.** Group of common rock-forming minerals, occasionally used as an abrasive or valued as semi-precious stones. All members are composed of a monoxide, sesquioxide, and silica, in the ratio of 3:1:3 (general formula  $3R''O.R'''_2O_3.3SiO_2$ ; where  $R''$  may be bivalent-calcium, magnesium, ferrous iron or manganese; and  $R'''$  may be trivalent-aluminium, ferric iron, chromium, or manganese). Winchell proposed two species, each composed of three members:

Pyrospite {	Pyrope	$3MgO . Al_2O_3 . 3SiO_2$
	Almandite	$3FeO . Al_2O_3 . 3SiO_2$
	Spessartite	$3MnO . Al_2O_3 . 3SiO_2$
Ugrandite {	Uvarovite	$3CaO . Cr_2O_3 . 3SiO_2$
	Grossularite	$3CaO . Al_2O_3 . 3SiO_2$
	Andradite	$3CaO . Fe_2O_3 . 3SiO_2$

Natural garnets generally contain two or more of the above molecules in mutually crystal solution. Minor varieties are hessonite, "South African Jade" (var. grossularite); "Adelaide Ruby" (var. almandite); "Bohemian" garnet, "Cape ruby," "Elie ruby," "Arizona" and "Colorado" ruby, rhodolite (var. pyrope); demantoid, "Uralian emerald," "topazolite" (var. andradite). Some of these are colloquial names for garnets of gem quality.

The garnets crystallise in the cubic system; they are hard, have no cleavage, and a specific gravity of 3.4-4.3. Colour is variable, often bright; they are commonly isotropic and possess a high refractive index. These properties make garnets of good quality valuable as gem stones and for watchmaking, and powdered iron-garnet (commonly almandite) has a technical application as an abrasive. Garnet is widespread in schists, gneisses, and contact-altered limestones, also in many plutonic rocks, but is rare in volcanic rocks. Deposits are rare of stones of gem quality or in sufficient quantity for mining as an abrasive. The principal varieties are described in this work under individual entries.

**Garnett, CONSTANCE** (1861-1946). British translator. Her maiden name was Black. After a brilliant career at Cambridge, she visited Russia to perfect her knowledge of the language. She began by translating the works of Gogol, and over some 20 years rendered into English the works of Dostoevsky, Turgenev, the plays and tales of Chekhov, and Tolstoy's War and Peace, and Anna Karenina. Into this achievement she put a sensitive literary conscience and scientific respect for both languages. She died Dec. 17, 1946.

Her husband, Edward Garnett (1868-1937), was a son of Richard Garnett, and was associated with the publishing firms of J. M. Dent and Sons, and Jonathan Cape. His plays included The Breaking Point; The Feud; The Trial of Jeanne d'Arc. He edited Letters from Conrad, and from Galsworthy. He died Feb. 19, 1937.

**Garnett, DAVID** (b. 1892). British novelist. Son of Edward and Constance Garnett, he was trained as a biologist at the Royal College of Science. His first novel, Lady Into Fox, 1923, was awarded the Hawthornden and Tait Black prizes, and quickly established his reputation as a writer of originality and whimsical imagination. His later books included Man in the Zoo, 1924; Go She Must, 1926; The Sailor's Return, 1928; No Love, 1929; The Grasshoppers Come, 1931; A Rabbit in the Air, 1932; Pocahontas, 1933; Beany-Eye, 1935; War in the Air, 1941. He was associated with the publishing firm of Hart-Davis. He edited Letters of T. E. Lawrence, 1938, and published volumes of autobiography 1953, 1955. Lady Into Fox and The Sailor's Return were made into ballets.

**Garnett**, OR GARNET, HENRY (1555-1606). English Jesuit. Educated at Winchester, he joined the



Henry Garnett,  
English Jesuit

Jesuits in 1575, and in 1587 was made superior of the English province. He became involved in the Gunpowder Plot (*q.v.*) and after hiding in Hindlip Hall, near Droitwich, gave himself up, maintaining to the end that he did not approve of the plot, though admitting his knowledge of it. He was executed in S. Paul's churchyard, May 3, 1606. On an empty husk of a blood-stained straw picked up near the gallows a perfect image of the dead Jesuit's face is said miraculously to have appeared "as if it had been painted," and "Father Garnett's straw" created a great stir.

**Garnett**, RICHARD (1835-1906). British librarian and author. Born at Lichfield, Feb. 27, 1835, he joined the staff of the British Museum in 1851. Becoming superintendent of the Reading Room in 1875, he was Keeper of Printed Books from 1890-99. Awarded the C.B. in 1895, he died on April 13, 1906. Among his many works are *Lives of Carlyle*, 1887; *Emerson*, 1888; *Milton*, 1890; *Twilight of the Gods*, 1888; various poems and translations, and contributions to the *Dictionary of National Biography*, the *Encyclopaedia Britannica*, etc.



R. Garnett.

**Garnier**, ROBERT (c. 1545-c. 1599). French dramatist. Born at Ferté-Bernard, Garnier studied law at Toulouse, and after practising at the Paris bar, became one of the royal councillors for Le Maine. He wrote a number of poems, mostly lost, and was important in the history of the development of French classical tragedy as a forerunner of Corneille. Garnier's tragedies of *Porcie*, 1573, *Cornélie*, 1573, and *Antigone*, 1580, are eloquent but dull; but his masterpieces, widely acclaimed in their day, were *Bradamanue*, 1582, and *Les Juives*, 1583. These, though their inherent interest is slight, show considerable poetic power and good dramatic technique. Garnier died at Le Mans c. 1599.

**Garnier-Pagès**, LOUIS ANTOINE (1803-78). French statesman.

Born at Marseilles, Feb. 16, 1803, he took part in the revolution of 1830, became an advanced republican deputy for Verneuil. 1842, and joined the ministry of Dupont de l'Eure after the revolution in 1848. He was appointed mayor of Paris, Feb. 1848, and minister of finance in March. In the constituent assembly he sat for the Seine dept. He retired from public life in 1871, and died in Paris, Oct. 31, 1878.

Louis was the half-brother of Étienne Joseph Garnier-Pagès (1801-41), a prominent radical and republican orator, who sat as deputy for Isère, 1831-34, and for Le Mans, 1835-41. *Pron.* Garneyay-Pazh-ayss.

**Garnishee** (Old Fr. *garnir*, to waru). Term used in English law. It is the procedure whereby a judgement creditor can obtain an order from the court directing a person who owes money to the judgement debtor to pay it over to the judgement creditor. For example, A has a judgement for £100 against B. B has £1,000 in Coutts's bank. A can obtain an order from a master ordering Coutts's to pay him £100 of B's money.

**Garos**. Primitive tribe in the Garo hills, S.W. Assam. Numbering about 150,000, they show kinship with the plains Kacharis. Short, dark, animistic, they practise fowl-sacrifice, matriarchy, and teknonymy—naming parents after their children. Headhunting has disappeared since British rule was established, after expeditions from 1790 to 1873. American Baptist missions work successfully among them. *See* Bodo.

**Garos Hills**. District of S.W. Assam. The district mainly consists of hills, and is principally inhabited by the Garos (*q.v.*), who form about three-quarters of the population. The area is 3,140 sq. m.; that under cultivation is uncertain. The principal articles of imports are rice, dried fish, pigs, fowls, goats, cattle, cloth and ornaments, while the exports consist of cotton, forest products, etc.

**Garonne**. River of France. It rises in the Pyrenees near Maladetta, and is for a few miles a Spanish stream. It enters France in the dept. of Haute Garonne, and, flowing mainly N.W., reaches the sea just below Bordeaux.

There it receives the Dordogne, and the two unite to form the estuary of the Gironde. Its chief tributaries are the Tarn and the Lot, both on the right; others are the Ariège, Save, Baise, Gers, and Salat. Toulouse and Agen stand on it, and it drains an area of over 30,000 sq. m.

**Gar Pike**. Name sometimes applied to the gar-fish (*q.v.*), but properly to *Lepidosteus osseus* and the alligator gar of American lakes.

**Garrauli**. Former petty state of India, merged in 1948 in the Vindhya union. Area 39 sq. m. Gopal Singh, who opposed the British occupation of Bundelkhand in 1803, causing trouble to the British authorities, received a pardon and a grant of this territory in 1812. Pop. 4,965.

**Garrick**, DAVID (1717-79). English actor. Born at Hereford, of Huguenot descent, on Feb. 19, 1717, he was educated at Lichfield grammar school, and later at Samuel Johnson's academy there. Becoming close friends, Johnson and Garrick set off for London to seek fame and fortune in March, 1737, arriving, according to the former, with only fourpence between them. Until 1741 Garrick engaged, with scant success, in a wine business, but his main interests were in the stage. His play *Lethe* was produced in 1740, and in March, 1741, he made his first appearance on the stage as Harlequin, appearing at Goodman's Fields Theatre in Oct. as Richard III. His great success in this part led him to become definitely an actor, under his own name.

During 1742-45 he played at Drury Lane, and after a season in



*D. Garrick*

After B. E. Pias, Nat. Port. Gal.

Dublin with Sheridan, appeared at Covent Garden during 1746-47. After this Garrick became the chief proprietor of Drury Lane. Specially noteworthy were his Shakespearian productions, which marked a great revival in the popularity of Shakespeare's plays and an attempt to secure accuracy in costume and mounting; but he took remarkable liberties with the text. Hamlet, Lear, Macbeth, and Richard III were among his most distinguished performances. After 1766 Garrick appeared only occasionally, except for his farewell season in 1776. His death on Jan. 20, 1779, called forth Johnson's famous remark that the event had "eclipsed the gaiety of nations, and impoverished the public stock of harmless pleasure." He was buried at the foot of Shakespeare's statue in Westminster Abbey.

A man of wit and versatility, Garrick enjoyed the friendship of many of the most distinguished figures of his day, to whom his house at Hampton was well known, and his services to the English stage were inestimable. His long association with the beautiful "Peg" Woffington ended in 1749, when he married Eva Maria Veigel, a German lady, who survived him until 1822.

**Bibliography.** Lives, James Smyth, 1887; P. H. Fitzgerald, rev. ed. 1899; David Garrick, J. Knight, 1894; Garrick and His Circle, F. M. Parsons, 1906; Some Unpublished Correspondence, ed. G. P. Baker, 1907; David Garrick, Dramatist, E. P. Stein, 1938.

**Garrick Club.** London club, founded in 1831 by Francis Mills and others for the general patronage of the drama and the formation of a theatrical library, and to combine the use of a club with the advantages of a literary society. Housed at first in 35, King St., Covent Garden, it moved to 15, Garrick St. in 1862. The 650 members include leading actors, literary men, and members of the legal profession.

**Garrick Theatre.** Playhouse in Charing Cross Road, London. It was opened April 24, 1889, by Sir John Hare with *The Profligate*, and continued under his management many years. Pinero's *The Gay Lord Quex* was put on here in 1899, and other successes were *Kismet*, 1911; *The Man in Dress Clothes*, 1922. Later came mostly light comedies and farces, except for the psychological thriller *Uncle Harry*, which ran through most of 1944. The theatre seats 1,250.

**Garrison** (Fr. *garnison*, from *garnir*, to supply). Body of troops manning a defensive position. The term is also applied to a military force stationed overseas; thus there are garrisons in Singapore, the West Indies, etc. Towns such as Aldershot, which are the headquarters of army commands, are known as garrison towns, as are York, Canterbury, and other territorial headquarters of regiments.

**Garrison, WILLIAM LLOYD** (1805-79). American abolitionist. Born at Newburyport, Mass., Dec.



W. Lloyd Garrison, American abolitionist

12, 1805, he was apprenticed to a printer. Before he was 20 he was writing articles, under the pseudonym of Aristides, attacking the institution of slavery. In 1827 he became editor of *The National Philanthropist*, the first paper founded in America to advocate temperance. In 1829 he joined the Quaker, Benjamin Lundy, in his work on *The Genius of Universal Emancipation*. Garrison now expressed such violent views on slavery that a libel action against him ended in his imprisonment. On his release he started, 1831, to publish at Boston a weekly journal, *The Liberator*.

He continued to produce his paper until 1865, having witnessed the triumph of his cause in 1863. He wrote *Thoughts on African Colonization*, 1832, and founded the Anti-Slavery Society, 1843. He visited Great Britain in 1833, 1846, 1848, and 1867. He died in New York May 24, 1879. *Consult* Life, Lindsay Smith, 1911.

**Garrod, DOROTHY ANNIE ELIZABETH.** British archaeologist. Educated privately and at Newnham, Cambridge, she was a research fellow of Newnham 1929-32. She directed archaeological expeditions to Gibraltar, 1927; S. Kurdistan, 1928; Mount Carmel, 1929-34; and was Disney professor of archaeology in the University of Cambridge 1939-52; she was also head of the department of archaeology and anthropology in Cambridge 1950-52.

During 1942-45 she served as an officer in the W.A.A.F. In 1949 and subsequent years, with Mlle. de Saint-Mathurin, she excavated at Angles-sur-l'Anglin, Vienne, France. She published *The Upper Palaeolithic Age in Britain*, 1926, and accounts of her excavations.

**Garros, ROLAND** (1888-1918). French airman. Born at St. Denis, in the island of Réunion, he studied music at Nice and Paris. Aviation, then in its infancy, attracted him, and he made altitude records in 1911-12, and came to the front as a daring and expert flyer. He became the idol of France by a successful flight of 500 m. across the Mediterranean from San Raphael to Bizerta. He also won in 1912 the Grand Prix of the Aero Club of France in a violent storm. In the First Great War Carros, a pilot feared by enemy airmen, advocated the synchronisation of propeller and machine-gun. Captured in 1915, he escaped in 1918, but was shot down and killed on Oct. 5. The Stade Roland Garros in Paris, scene of national sporting events, perpetuates his name.

**Garrote** (Span. *garrrote*, cudgel). Spanish method of execution by strangulation. Originally the condemned person was seated in a chair fixed at the back to an upright post. A cord was placed round his neck and also round the post. Strangulation was produced by twisting the cord with a stick after the manner of a tourniquet, for which a former alternative term was garrot. Later on the chair was provided with a hinged iron collar, in the back of which was a sharp-pointed screw, or a lever. Death was caused by dislocation of the spinal column, or by a blade which on being forced forward severed the spinal cord.

During the Inquisition prisoners who recanted were occasionally offered death by the garrote as a mark of favour, instead of death by actual burning. But the former, in the hands of a careless or unskilful executioner, was capable of inflicting severe torture before the end came. Possibly the garrote came into use in Spain as a result of the Moorish rule in the country, for, in its original form, it closely resembled the use of the bowstring in the East.

The winter of 1862-63 was marked in Great Britain by a serious outbreak of highway robbery with violence, many victims being attacked from behind and half-strangled by a cord or handkerchief thrown over their heads. The evil became so serious that in 1863 the Garroters Act was passed authorising the punishment of offenders by flogging.

**Garry.** Loch and river in the Atholl district of Perthshire, Scotland. The river has its source in the Loch, and flows 20 m. E.S.E. until it joins the Tummel about

5 m. S.E. of Blair Atholl. In 1937 work was completed on a tunnel through the mountains to convey the waters of Loch Garry to Loch Eriicht, 5 m. W., to augment the output of the Rannoch hydro-electric power station.

**Garry.** Lake of Canada, in the North-West territories. It is in lat. 66°, and on the borders of the Arctic circle. The Back, or Great Fish, river passes through it, carrying its waters to the Arctic Sea. Its area is 980 sq. m. There is also a Garry Island, this being on the Arctic Ocean, off the mouth of the MacKenzie river.

**Garrya.** Small genus of evergreen shrubs. They belong to the family Garryaceae and are natives



Garrya. Spray of foliage and flower and sectional diagram of a berry

of the warmer parts of America. They have opposite, oval or elliptic leaves, and greenish-white or yellowish flowers in long pendulous sprays; the males being on one plant, the females on another. *Garrya elliptica*, a native of California, is frequently grown in the warmer parts of Europe.

**Garshin, VSIÉVOLOD MICHAÏLOVICH** (1855-85). Russian novelist. He was an "infant prodigy," his essay on Death, written when he was 17, being a piece of surprising realism. His short stories, among which the Red Flower and The Signal are perhaps his best works, show him at once imbued with the spirit of the romantics and greatly influenced by Tolstoy. Loathing war, he served as a soldier against the Turks in 1877, that he might not shirk what others were compelled to endure. The execution of a friend drove Garshin mad, and though he recovered his mind remained somewhat unbalanced. On March 24, 1885, he committed suicide.

**Garstang.** Town of Lancashire, England. On the river Wyre and the main road from industrial Lancashire to the Lake District, it is 11 m. N.N.W. of Preston, and

has a railway station called Garstang and Catterall. The main street is narrow, with old and picturesque properties. It has bridges over the river and a canal. S. Thomas's church dates back to 1497, and Bonds R.C. church is a Gothic structure of 1858. On an eminence to the E. are the ruins of Greenhalgh Castle, built 1490, and dismantled 1650. Garstang was formerly a borough, having had charters granted in 1314 and 1680. Market day, Thurs. Pop., of parish, 1,200.

**Garstang, JOHN** (1876-1956). British archaeologist. Educated at Blackburn grammar school and at Jesus College, Oxford, he devoted himself to archaeology, being professor of archaeological method at Liverpool University 1907-41. He excavated the Roman site of Ribchester, and in Egypt at Abydos, Beni Hassan, Negada, in the Sudan at Meroe; the Hittite site Sakjegeuzi in 1908 and 1911; was director of antiquities in Palestine 1920-26, supervised work at Jericho 1930-36, and excavated at Mersin in S. Turkey 1937-39. He was part-founder and first director of the British institute of archaeology at Ankara. He died at Beirut Sept. 12, 1956. His publications included *The Hittite Empire*, *Joshua and Judges*, *The Heritage of Solomon*, *The Story of Jericho*.

**Garston.** Port and parish of Lancashire, England, now included in the city of Liverpool. Here are rly. docks from which coal is shipped. There are iron, copper, match, and bobbin works. Liverpool, Garston, is the name of a bor. constituency.

There is a parish of the same name near Watford, Hertfordshire. East Garston is a village situated on the Berkshire Downs, with a rly. station; pop. 386.

**Garter, ORDER OF THE.** British order of knighthood. It was originally instituted as a purely military order by King Edward III in 1348, as a means of rewarding comrades-in-arms, but in modern times is more generally bestowed on royal personages and on leading representatives of the British peerage. The first statutes limited its number to the sovereign, the prince of Wales, and 24 other knights companions. The order was enlarged during the reigns of George III and William IV, and now includes the above 26 knights as a constituent part of the original foundation, together with such descendants of George I as have been elected, or may be eligible to be elected, with the addi-

tion of those foreign rulers and princes who may be admitted.

Each knight is allotted a stall in S. George's chapel, Windsor Castle, on which is set up a plate engraved with his titles and coat of arms. The earlier plates are some of the most interesting and remarkable examples of heraldic design. Above each knight's stall are also placed, during his lifetime, his banner, sword, helmet, and crest. There was formerly a special ceremony in the chapel, when the new knight was invested with the habits and insignia of the order and conducted to his stall, but for ordinary knights companions this ceremony has been dispensed with, they are usually invested by the sovereign personally.

The habits and insignia of the order are the garter, mantle, surcoat, hood, star, collar, George, and lesser George. The garter of dark blue velvet inscribed in gold with the motto of the order *Honi soit qui mal y pense* (Evil be to him who evil thinks), is worn below the left knee. The star has a buckled circular garter, with the motto, enclosing the cross of S. George, the whole enamelled in the proper colours, and surrounded by an eight-pointed star of silver rays; it is worn on the left breast. The collar is of gold and consists of 26 Tudor roses (alternately red and white), each within a circular garter, and joined together by chains and interlaced knots of cords. The George, in enamelled gold, representing S. George and the dragon, is suspended from the collar. The lesser George has the same device on an enamelled ground surrounded by an oval garter. It is worn suspended



Garter. Insignia of the Order. Top, star; centre, the garter; below, collar and George

from a broad ribbon of garter blue, which passes over the left shoulder and under the right arm. On the death of a knight companion his insignia go back to the sovereign.

An embroidered garter with the motto of the order was formerly worn on the left arm by the wife of a K.G. Nowadays the only women admitted to the Order are the Queen of England and foreign sovereigns.

The original statutes provided that on or about the feast of S. George (April 23) the knights companions should meet at Windsor and attend a special service in S. George's chapel. This was carried out for many years at irregular intervals, but finally discontinued.

The order has the following officers: prelate, the bishop of Winchester; chancellor, the bishop of Oxford; registrar, the dean of Windsor; herald, garter king of arms; gentleman usher of the black rod; and secretary. Included in the order of the garter under the statutes are the canons and the military (formerly called poor) knights of Windsor, and the lay clerks and choristers of S. George's chapel. See Heraldry; Knighthood; Military Knights of Windsor.

**Bibliography.** The Institution, Laws and Ceremonies of the Most Noble Order of the Garter, E. Ashmole, 1672, ed. T. Walker, 1715; The History of Antiquities of Windsor Castle . . . and Ceremonies of the Order of the Garter, J. Pote, 1749; Memorials of the Order of the Garter, G. F. Beltz, 1841.

**Garter King of Arms.** Principal officer of the English College of Arms. His office was instituted in 1417. He is herald of the order of the garter.

**Garth** (Icel. *garthr*, enclosure). Enclosed space of ground, particularly the turf within a cloister, known as the cloister-garth. The term is also used to describe a kind of dam or weir for fishing purposes.

**Gartok.** Chief town in W. Tibet. It is situated at an altitude of 14,656 ft., 800 m. W. of Lhasa. It was opened in 1904 as a trade mart, with a British commercial agent, as a result of the Young-husband expedition to Lhasa.



Garter King of Arms

**Garua.** Town of French Cameroons, W. Africa. In the N.W. of the territory, it is situated on the Benue river, which is navigable for shallow boats to this point from June to Dec. It is the chief centre of the Garua district, and station on the Benue route to the Niger.

**Garumnian.** Local stage of the Upper Cretaceous series of stratified rocks reaching a thickness of 2,500 feet; it is developed in Provence. It is notable on account of a fresh-water origin, containing fresh water and terrestrial fossil shells.

**Garvice, CHARLES** (d. 1920). British writer of fiction. He began his remarkable literary career with the publication of a book of verses, and a three-vol. novel, Maurice Durant, followed in 1875. But his popularity, first in America, then in the U.K., was based on an almost countless succession of conventional sentimental romances, semi-sophisticated variants of the Cinderella theme, impeccable in their moral tone, which began in 1890 and continued until his death. Characteristic titles include *Just a Girl*; *Her Heart's Desire*; *In Cupid's Chains*; *Love Decides*; *The Gold in the Gutter*; *The One Girl in the World*. These and many others, widely reprinted in cheap editions, made him one of the first of "best-sellers" and brought him a considerable fortune. He died at Richmond, March 1, 1920.

**Garvie, ALFRED ERNEST** (1861-1945). British divine. He was born of Scottish parents in Poland, Aug. 29, 1861, and educated at George Watson's College, Edinburgh, and Edinburgh and Glasgow universities. He was principal of New College, Hampstead, 1907; chairman of the Congregational Union of England and Wales, 1920; president of the National Free Church Council, 1923; and moderator of the Federal Council of the Free Churches, 1928. For more than a generation the training of ministers for the Congregational Church was largely in

Garvie's hands. Among his published works are *The Christian Personality*, 1904; *Tutor unto Christ*, 1920; *The Beloved Disciple*, 1922; *Christian Moral Conduct*, 1938; and he



A. E. Garvie, British divine

edited the Westminster New Testament. He died March 5, 1945.

**Garvin.** JAMES LOUIS (1868-1947). British journalist and editor. Born, April 12, 1868, at Birkenhead, of Irish stock, he wrote his first articles for *The Eastern Morning News*, Hull, in 1885. He became leader writer on *The Daily Telegraph*, 1899, and edited the *Outlook*, 1905-06, and *The Pall Mall Gazette*, 1912-15. But he is best remembered as editor of *The Observer* 1908-42; not only did he lift the status of that Sunday newspaper to unprecedented height, but by his own regular long articles therein made himself a forceful political influence, particularly in imperial and foreign affairs. His power lay in his expert evaluation of an immediate situation rather than in consistency to any political principle, apart from unflinching patriotism. When at last his views diverged too sharply from those of his proprietor and he resigned the editorship of *The Observer*, he wrote regularly for *The Sunday Express* for one year and then returned, at Lord Camrose's invitation, to *The Daily Telegraph* as a special political contributor. Garvin edited the 14th edition of the *Encyclopaedia Britannica*, and wrote the official Life of Joseph Chamberlain, in two volumes, 1932-33. He was made C.H., 1941, and died at his home at Beaconsfield, Jan. 23, 1947. *Consult Life*, K. Garvin, 1948.

**Gary.** City of Indiana, U.S.A., in Lake co. At the head of Lake Michigan, 30 m. S.E. of Chicago, it is served by several rlys. The city owes its existence and prosperity to the U.S. Steel Corporation, which in 1905 selected here a site of 8,000 acres of dune and swamp crossed by the Grand and Little Calumet rivers. Some £25,000,000 was spent on furnaces and ovens, tinplate, cement, and electric power plants, and Gary has become the chief city in the world for steel production, its finished goods ranging from screws to locomotives. Tinplate and cement are also turned out. A few independent enterprises have established plants. Gary has some of the largest and best school buildings in the Middle West. Pop. (1950) 133,911.



J. L. Garvin, British journalist

**Gas** (word invented by van Helmont from Gr. *khao*s, chaos). Gas is matter in a perfectly fluid state. All forms of matter, solid, liquid, or gas, consist of molecules which attract each other. In a gas, however, the distances between molecules are large compared with their size, and the attractive forces are small compared with those in solids and liquids, hence it is that a gas readily assumes the shape and volume of its container. Whenever a gas is confined within a closed container, it exerts pressure, and Boyle's law states that if the temperature of a confined gas (*i.e.* of a constant mass) is maintained constant, then the product of the pressure  $P$  and volume  $V$  it occupies is constant. At a constant pressure the volume  $V$  occupied by a given mass of gas is directly proportional to the absolute temperature  $T$  (Charles's law).

These two laws can be combined in the relation  $\frac{PV}{T} = \text{constant}$ , the

value of the constant being dependent on the mass of gas considered. Avogadro's law states that equal volumes of all gases under identical conditions of temperature and pressure contain equal numbers of molecules. Hence if the gas contains  $n$  gram-molecules, the previous relation may

be written as  $\frac{PV}{T} = nR$  or  $PV = nRT$ , where  $R$  is the universal gas constant and has a value of  $8.318 \times 10^7$  erg/degree or 1.9869 cal/degree.

A gas which obeyed the equation  $PV = nRT$  would be a perfect gas, but in practice no such gas exists, with the possible exception of photon gas consisting of light quanta only. The degree to which the behaviour of an actual gas approximates to that of a perfect gas is dependent upon its nature as well as its condition. In general the greatest deviation is shown by systems of complicated molecules such as those of the vapours of organic liquids under conditions of high pressure and low temperature. Systems of simple molecules, such as the so-called permanent gases, oxygen, helium, hydrogen, etc., which liquefy only at very low temperatures, show a good approximation to the law, and the agreement becomes closer with increasing temperature, at low pressures.

An interpretation of the ideal gas laws was forthcoming from the kinetic theory of gases which

was developed at the same time as the atomic theory of matter. In its simplest form the assumptions underlying the kinetic theory were:

(1) that the diameter of a gas molecule is small compared with the average distance between the molecules, *i.e.* that the actual volume occupied by the molecules is negligible in comparison with the total volume of the gas;

(2) that the time occupied in an encounter between two molecules is small compared with the time interval between two collisions;

(3) that a large number of molecules exists in the smallest volume of gas with which it is possible to deal;

(4) that the velocity of motion is very great, so that many collisions occur in a short time, and

(5) that the mutual attraction between two molecules is negligibly small and the pressure exerted by the gas is ascribed entirely to molecular bombardment of the walls of the enclosure.

#### Constant Kinetic Energy

The molecules of the gas in this simple theory are considered to be hard and perfectly elastic spheres so that at constant temperature the kinetic energy of the confined molecules remains constant despite repeated intermolecular and wall collisions.

By considering a cubical box of volume  $V$  containing  $n$  molecules of individual mass  $m$  travelling with velocity  $c$  cms. per sec. (which may be resolved into component velocities  $u$ ,  $v$ , and  $w$  parallel to the sides of the cube), it can be shown that the changes of momentum experienced by the molecules rebounding from the walls give rise to a pressure  $P$  defined by  $PV = \frac{1}{3} m n u^2 = \frac{1}{3} m n v^2 = \frac{1}{3} m n w^2$ .  $u^2$ ,  $v^2$ , and  $w^2$  will be average values, and since a large number of molecules are concerned it follows that  $u^2 = v^2 = w^2 = \frac{1}{3} c^2$  where  $c$  is the root mean square velocity. Hence it follows  $PV = \frac{1}{3} M c^2$  if  $n$  refers to the number of molecules in 1 gm. mol. and  $M = \text{mass of 1 gm. mol.}$  If a pure gas is in thermal and mechanical equilibrium, then, although the velocities of the molecules may vary from time to time and from molecule to molecule, yet any particular velocity must be equally distributed in all directions at all places.

Since according to the kinetic theory the energy of an ideal gas is entirely kinetic, then it follows that the energy associated with 1 gm. mol. is  $E = \frac{1}{2} M c^2 = \frac{3}{2} RT$ ,

for  $PV = \frac{1}{3} M c^2$ . Hence the energy of an ideal gas is directly proportional to the absolute temperature, and furthermore the value of  $c$  is

given by  $c = \sqrt{\frac{3RT}{M}}$ , *i.e.* at a fixed

temperature the molecular velocities of different gases are inversely proportional to the square root of the molecular weights. This law was tested experimentally by Graham by allowing gases at a constant temperature to effuse through a porous plug into a Torricellian vacuum, and the times required to produce a fixed fall in the height of the mercury column were noted. He found that the law of effusion was, like Boyle's law, approximately obeyed by real gases. An idea of the magnitude of the molecular velocities is obtained when it is stated that the root mean square velocities of hydrogen and oxygen molecules at 25° C. are respectively 192,000 cms. per sec., and 48,200 cms. per sec.; the latter is equivalent to 1,080 m.p.h.

The variation in the pressure of a given mass of gas with change of temperature has been utilised to define the absolute scale of temperature. Experiment showed that  $P_t = P_0 (1 + \alpha t)$ , where  $P_t$  and  $P_0$  are respectively the pressures of the gas at  $t^\circ$  C. and  $0^\circ$  C. and  $\alpha$  is the so-called pressure coefficient which is approximately equal to  $\frac{1}{273}$  for the inert gases. According to the kinetic theory, then, the lowest temperature obtainable is when  $\alpha t = -1$  or  $t = -273^\circ$  C., which is defined as the zero of the absolute scale. It follows then that the absolute temperature  $T$  corresponding to  $t^\circ$  C. is given by  $T = t + 273$ .

When the temperature of any gas is lowered sufficiently, the pressure remaining constant, it will condense into a liquid. Alternatively at constant temperature an increase of pressure may result in liquefaction if the temperature is below a certain critical value which is a characteristic of the gas. Curves showing the relation between  $P$  and  $V$  at constant temperature are known as isothermals, and below the critical temperature they show discontinuities at the transition stage between gas and liquid. The failure of the gas equation  $PV = nRT$  to predict such changes has led to the formulation of various equations of state, such as that of van der Waals, *viz.*  $(P + \frac{a}{V^2})(V - nb) = nRT$ , where  $V$  is the volume occupied by



n gm. mol. of gas. The term  $n b$  is a correction for the finite volume occupied by the molecules themselves and  $\frac{a}{\sqrt{v}}$  is a term introduced

by van der Waals to allow for the cohesive force between the molecules, the possibility of repulsion being ignored. The factors  $\frac{a}{\sqrt{v}}$  and  $b$  may be found from experimental observations on an actual gas, and for the constant  $b$  a value for the effective molecular radius can be deduced from it.

By means of the kinetic theory, formulae can be developed expressing various transport phenomena

in terms of the mean free path ( $\lambda$ ) and the average velocity ( $v$ ) of the gas molecules. These formulae in their simplest forms are as follows. Coefficient of Viscosity :

$$\eta = \frac{1}{3} m n \lambda v,$$

Coefficient of Diffusion :  $D = \frac{1}{3} \lambda v,$

Coefficient of Thermal Conductivity :  $k = \frac{1}{3} C_v n \lambda v.$

$C_v$  is the specific heat per gas molecule at constant volume,  $n$  is the number of molecules per c.c.  $\lambda$ , the average distance between inter-molecular collisions, is given by  $\lambda = \frac{0.74}{\pi n \delta^2}$  where  $\delta$  is the molecular diameter.

R. W. Stephens, Ph.D.

## GAS: FOR LIGHT, HEAT, & POWER

P. F. F. Clephane, M.Sc., North Thames Gas Board

*This article describes the production and the uses of coal gas, by far the most important gas in commercial use, as well as those of producer gas, blast furnace gas, water gas, petrol air gas, natural gas, butane, acetylene, hydrogen, and oil gas*

A combustible gas burning with a luminous flame was discovered in the neighbourhood of coalfields during the 17th and 18th centuries. John Clayton, rector of Corfton near Wakefield, first distilled coal and lighted the gas produced from it about 1684, though the details were not published until 1740. William Murdoch of Ayrshire was the first to produce illuminating gas for commercial use : in 1792 he used it to light his house at Redruth, Cornwall. In 1798 he lit part of the works at Soho, Birmingham, of Boulton & Watt, with whom he was then associated, and later lit the cotton mill of Phillip & Lee at Manchester. For his work on gas he was awarded the Rumford gold medal of the Royal Society in 1808.

Samuel Clegg, who succeeded Murdoch at Boulton & Watt, was a pioneer in the invention of gas making and measuring equipment; his inventions including the rotating gas meter and the hydraulic main. In 1807, in the face of opposition, F. A. Winsor lighted Pall Mall, London, by gas. Westminster Bridge was lit by gas, 1813, the Westminster streets, 1814.

Winsor's company, the Chartered Gas Light and Coke Co. (later the Gas Light and Coke Co., part of the North Thames Gas Board from 1949), was established in 1812; other companies followed. By 1817 about 300,000 cu. ft. of gas was sold per day in London; in 1955 the average was 450,000,000 cu. ft. per day.

By 1847 parliament took measures to control the powers of gas

companies and the quality of the gas made, and in 1860 allocated an area of supply to each undertaking.

Up to about 1875 gas was used almost exclusively for lighting, its high illuminating power being considered its most important quality. It was burnt from unshielded, flat flame (so-called batswing) burners. From about 1880 competition from electricity and liquid fuel stimulated the technical development of gas manufacture and devices for its utilisation, and the invention in 1884 by Karl Auer von Welsbach of the incandescent mantle (see Gas Mantle) revolutionised gas lighting.

### Composition of Coal Gas

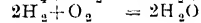
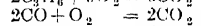
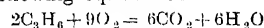
The composition and calorific value of coal gas, the type of gas normally piped and sold to consumers in towns, depends on the method by which it is made; in the U.K. its calorific value when distributed as town gas is controlled by act of parliament. The following is a typical analysis of town gas (gas from a continuous vertical retort, steamed). (Many other minor constituents are present.)

		p.c. by volume
Carbon dioxide	CO <sub>2</sub>	4.0
Unsaturated hydrocarbons	C <sub>n</sub> H <sub>m</sub>	2.0
Oxygen	O <sub>2</sub>	0.4
Carbon monoxide	CO	18.0
Methane	CH <sub>4</sub>	20.0
Hydrogen	H <sub>2</sub>	49.4
Nitrogen	N <sub>2</sub>	6.2

This gas has a gross calorific value of 475 B.Th.U. per cu. ft. and a specific gravity of 0.48 (air=1.0).

C<sub>n</sub>H<sub>m</sub> varies in composition from about C<sub>2.5</sub>H<sub>5.0</sub> to C<sub>4</sub>H<sub>8</sub>.

On complete combustion, town gas produces carbon dioxide and water vapour according to the following equations :



One cu. ft. of town gas of average composition requires about 4½ cu. ft. of air for complete combustion and produces about ½ cu. ft. of CO<sub>2</sub> and 1 cu. ft. water vapour.

The calorific value and other physical properties of the gas, e.g. its specific gravity, can be obtained approximately by adding up those of the individual constituents.

### Kinds of Coal Used

Coal for gas making by traditional methods should have a high volatile content and should cake. A non-caking coal, e.g. anthracite, does not produce coke, whereas a strongly caking coal produces hard and relatively unreacting coke, of great value for metallurgical processes. The low carbon bituminous coals with a volatile content 30-40 p.c. of the coal substance are therefore chiefly used for gas making. In general, the greater the calorific value and carbon content of coal, the less its volatile content, and blending of coals may be necessary to suit a particular carbonising plant. Brown coal, or lignite, has been extensively used in Germany for gas making but, on account of its high moisture content, a special technique of drying and briquetting before carbonisation had to be developed.

The essential manufacturing processes are: (1) the distillation or carbonisation of coal; (2) the cooling and condensation of volatile products; (3) washing of the gas to remove ammonia; (4) purification to remove hydrogen sulphide; (5) measurement of the gas produced; (6) storage in gas holders.

Murdoch originally used iron pots charged from the top and heated from below. The coal was placed in an iron basket which was lifted out when carbonisation was complete. From these developed long narrow cast iron retorts set horizontally in which coal was charged, leaving a free space at the top. When carbonisation was complete, the charge was raked out, and more coal put in. Fireclay was soon substituted for cast iron,

so that higher carbonisation temperatures, yielding more gas per ton of coal, could be used. The substitution of silica for fireclay in 1920 continued the same trend. Methods of manufacture vary somewhat, but the following is a normal process.

It is essential to distil the coal in closed vessels, from which the volatile matter escapes and is collected, leaving a porous mass of coke behind. The fireclay or silica retorts used, which may be set horizontally or vertically in brick, are heated by producer gas (*v.i.*) to a high temperature (1,250°–1,350° C.). Horizontal retorts are about 20 ft. long, have the shape of a half inverted D (≡) or are oval, and are about 24 ins. across (the major axis) and 16 ins. high (the minor axis).

#### Feeding the Retort

Vertical retorts are about 20 ft. deep, of symmetrical tapering section, either rectangular or elliptical. In horizontal or in intermittent vertical retorts the coal is allowed to remain until recharging is necessary, when the old charge is removed mechanically and a fresh one inserted. In continuous vertical retorts the coal is introduced through the top continuously and slowly works its way down to the base, advantage being taken of gravity for feeding and removal in both types of vertical units. Some 4–8 tons of coal pass through in a day, the operating temperatures being 900°–1,350° C. The qualities of the gas are modified by steaming, which forms some water gas and also cools the hot coke at the base of the retort, and maintains a slight positive pressure to prevent the ingress of air when coke is discharged.

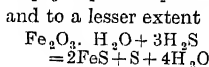
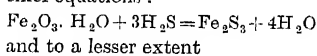
There are two stages of carbonisation; in the first the coal is broken down and in the second the substances produced in the first are decomposed on the hot sides and spaces of the retort, giving simpler hydrocarbons.

#### Treatment of Hot Gases

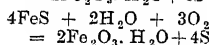
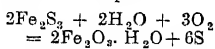
After leaving the retorts through an ascension pipe fixed to the top of the mouthpiece, the hot gases pass through a seal into a collecting main, and then through a water- or air-cooled condenser. Here the gas flows through a series of tubes in which most of the residual tar and liquor is removed in liquid form. From this liquor and the tar are produced the valuable by-products of the gas-making indus-

try—drugs, dyestuffs, fine chemicals, ammonium sulphate, etc.

The gas is then washed in water scrubbers to remove the rest of the ammonia and the residual tar fog. Electrostatic detarrers are often used before the washers. The gas is assisted in its passage through the plant by "exhausters." Next the gas is led into large boxes containing moist hydrated oxide of iron or bog ore, spread in layers and covering a large surface area. Here the hydrogen sulphide is removed according to the following chief equations:



A number of side reactions also take place producing more complicated sulphur compounds. The "fouled" oxide, most of which has been turned into sulphide, is revived by exposing to moist air when the following chief reactions take place:



The process of revivification is as a rule carried out *in situ*, by mixing a small quantity of air with the gas. In the U.K. gas supplying boards are under a statutory obligation to remove all traces of hydrogen sulphide from their product.

To remove traces of organic sulphur compounds which do not come out in the purifiers, catalytic methods involving the use of nickel and molybdenum sulphide and similar bodies have been developed.

Naphthalene and benzole are then removed from the gas, after which its volume is measured by passing it through large station meters whence it passes to the familiar large-capacity storage holders (*see* Gas Holder).

To reduce rust formation in service pipes to a minimum, many distribution systems are fed by dry gas which has been passed through a dehydrating plant after it leaves the holder. A common system is to pass the gas up a tower down which calcium chloride solution is sprayed. From there the gas passes to the distribution system.

#### Yield of a Ton of Coal

A normal yield from 1 ton of coal carbonised in continuous vertical retorts with a thermal efficiency of 78 p.c. is:

16,000 cu. ft. gas (500 B.Th.U. per cu. ft.)  
10 cwt. coke  
10 galls. tar  
25 lb. fertiliser (ammonium sulphate)  
3½ galls. benzole  
10 lb. other by-products  
80 lb. ash.

A distribution system must take account of the character of the district, possible future development, peak loads, supply sources in relation to areas to be served. Distribution may be by high pressure (30–50 lb. per sq. in.) or medium pressure (15–150 ins. water gauge) in trunk mains ultimately producing a pressure in a service through appropriate governors of 3–5 ins. w.g. at consumers' premises. This pressure may be up to 10 ins., but in Great Britain it must not fall below 2 ins.

Determination of the quantity of gas flowing through a main, or alternatively the diameter of a main to carry a known capacity, can be calculated by the following formulae which take into account the relation between coefficient of friction and diameter of pipe. The expressions are based on the mean figures for rough and smooth pipes:

*Low Pressure* (up to 10 ins. w.g.)  
 $Q^{0.9} = 1170 \sqrt{(hd^{4.8}/S^{8.0}L)}$ ,

*High Pressure*

$$Q^{0.9} = 1130 \sqrt{(d^{4.8}(P_1^2 - P_2^2)/S^{8.0}L)}$$

where  $Q$  is volume of gas in cu. ft. per hr.;  $h$ , pressure in ins. w.g.;  $d$ , diameter of pipe in ins.;  $S$ , specific gravity of gas (air=1);  $L$ , length of pipe in ft.;  $P_1$ ,  $P_2$ , absolute pressure in lb. per sq. in. at beginning and end of pipe.

Medium pressure trunk mains are usually of cast iron and vary in diameter from 2 to 48 ins. High pressure mains are usually of steel, of diameter up to 8 ins. Both types of main are suitably wrapped or protected where necessary to guard against corrosion. Service pipes, *i.e.* the pipes feeding buildings, and appliances are usually of mild steel.

#### The Gas Mantle

The high quality of the light produced by gas is in large measure due to the Welsbach mantle, the mixture for which was patented in 1893, and remains the best yet found. Two systems are used for lighting: low pressure and high pressure. In both, Bunsen burners are enclosed by a mantle of suitable shape, the gas consumption being controlled by an eccentric pin or needle valve in the supply.

For domestic lighting and side streets, normal gas pressure is used; for lighting of main streets and shops high gas pressure up to 100 ins. w.g. Sometimes premixed air and gas is used; in such lamps, used in the lighting of some London thoroughfares, mean hemispherical candle-powers of 3,000–4,000 can be readily maintained. Street lighting systems can be, and usually are, automatically lit, a permanent pilot being built into the burner. Many street lights are, in addition, fitted with clock controls which make it possible to light and extinguish the gas at a set time interval.

Apart from lighting, there are three main domestic uses of gas—*viz.* for cooking, space heating, and water heating. Flexibility of control, cleanliness, speed of operation, and efficiency are its main advantages in this field. There are over 8,000,000 gas cookers (*see* Gas Cooker) in use in Great Britain: they consume about 40 p.c. of the total gas sold. Because of the importance of this cooking load, continuing research goes on to improve the performance of the cooker. On the hotplate, thermal efficiencies of over 50 p.c. are attainable.

#### Domestic Heaters

Different types of appliance for heating rooms by gas are described under Gas Stove. The suitable system depends on size of room, use to which it is put, its aspect, etc. The normal flued gas fire has a radiant efficiency of 65 p.c. If it also emits convected heat, it has an efficiency of 80 p.c. A standard for fuelless heaters in a well ventilated room is 10 cu. ft. of gas per hour per 1,000 cu. ft. of space.

Radiant heaters are of two types: (a) "black" emitters (*i.e.* those not radiating light), (b) high temperature emitters. In (a) a hot panel at temperatures of 600°–900° F. gives off radiation, the heating effect being analogous to that from a conventional radiator. In (b) the heater has refractory or metal elements which are heated to a high temperature (about 900°–1,000° C.) producing a high intensity. In general these heaters are installed above ground level and are used for heating large spaces (factories, churches, etc.). Small models are used as background heaters for "topping up" heating in large rooms.

Appliances for heating water by gas include small and large instantaneous heaters, storage heaters, and central heating units.

The thermal efficiency of an instantaneous sink heater is about 80 p.c. Efficient units containing water heater, tank, and necessary piping are designed for insertion complete into houses. All gas equipment of current manufacture conforms to the appropriate British standard specification laid down to facilitate manufacture and installation.

Other domestic gas appliances available include drying cabinets, irons, and refrigerators. In the domestic absorption type refrigerator, gas heats a boiler, driving off ammonia which is cooled, liquefied under pressure in a closed system, and rapidly vaporised, extracting heat from the cabinet in the process. The resulting gas (helped in its circulation by a flow of hydrogen) is absorbed, returned to the boiler, and the cycle starts again. The system is noiseless, cheap, and efficient, and has very long life owing to the absence of any moving parts.

#### Gas Used for Power

Gas is used for power in three main ways: (1) for running-in automobile engines; (2) for generating electric power, driving compressors, shafting, etc. (*see* Gas Engine); (3) for vehicle propulsion as an emergency measure.

For running-in engines, gas has the advantages over liquid fuels that (a) it is as cheap to use; (b) with the special carburettor available perfect mixing is possible; (c) it is possible to run at low speeds without difficulty; (d) there is no wear on cylinders; (e) exhaust gases contain no carbon monoxide, a point of particular importance in small garages and confined spaces; (f) there are no fuel storage and handling troubles.

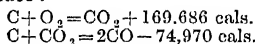
Propulsion of vehicles by gas is possible by the use either of high pressure gas cylinders in which gas is stored at 2,500–3,000 lb. per sq. in. (these are heavy and involve a high capital cost) or of low pressure gas bags mounted on the roof (these can be easily refilled, but they offer resistance to movement, and need frequent recharging).

Gas in industry has the great virtues of ease of handling, flexibility, and high heat output, the last quality being of great importance in the many forms of heat treatment in the metal industries, such as annealing, hardening, tempering, metal melting, where absence of ash is essential and high rates of production have

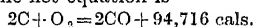
to be maintained. Temperatures of 1,500° C. are easily obtainable with air blast gas, that is, gas at atmospheric pressure mixed with air at about 10 ins. w.g. Automatic proportioning ensures a correct mixture ratio at all gas rates and pressures.

Other common industrial uses include drying by convected and radiant heat, steam raising, banana ripening, bread and biscuit baking, case hardening, sugar boiling, oil and varnish boiling, cremation, rubber vulcanising and moulding, air conditioning, turkish bath heating, fish frying, cooking and heating in hotels, clubs, restaurants, and hospitals. Painted objects passed through black emitter tunnels where the panels are heated to about 650° F., giving a high radiant heat intensity, dry in minutes instead of the hours required by older methods, an important factor in increasing output of a great variety of articles.

**PRODUCER GAS.** This consists of 20–28 p.c. carbon monoxide, 10–13 p.c. hydrogen, 50–55 p.c. nitrogen, together with small amounts of carbon dioxide, unsaturated hydrocarbons, and methane. It is manufactured by blowing a limited amount of air with usually some steam through a bed of incandescent fuel (coal or coke). The following chief reactions take place:



The net equation is



The process is thus exothermic, and the reaction once started keeps the whole mass hot. Careful control is necessary, to limit the air supply and to maintain a suitable fuel bed temperature (above 1,000° C.); too much air will turn the producer into a coke fire.

The use of steam absorbs some of the liberated heat in the water gas reaction, increases the yield of gas, and prevents formation of hard clinker by moderating the temperature of the fuel bed.

Producer gas has a low calorific value (about 125 B.Th.U. per cu. ft. gross); it is invariably used to heat the retorts in which ordinary coal gas is made, and for this purpose is generated on a large scale and fired round the retort settings. It can also be generated in small units, both static and mobile, of capacities ranging between 2.5 and 22.5 therms per hour. These units are used for driving vehicles. Units working on wood charcoal, lignite, peat,

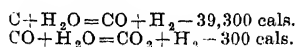
and woodchips are much in use on the Continent. All involve in effect the construction of a fire in a vertical cylindrical chamber through which a limited amount of air and steam is drawn.

Producer gas has a flame temperature of about 1,600° C. (compared with 2,200° C. for coal gas), and requires only about 1 cu. ft. of air to burn 1 cu. ft. The calorific value is one-quarter that of coal gas, and to use the gas in place of coal gas it is therefore necessary to instal mains of four times the capacity or, as is more common, increase the pressure by boosters. This pressure ranges between 12 and 25 ins. w.g., depending on the size of the producer plant. The reserve thus created allows for other factors such as the high specific gravity (0.9, compared with 0.45 for coal gas), which increases the resistance to flow.

**BLAST FURNACE GAS.** This is rarely used outside the iron and steel industry. When iron is smelted with coke, a blast of air is introduced through the tuyeres at the bottom of the furnace, burning the coke to carbon monoxide. Part of this carbon monoxide is oxidised to carbon dioxide. The gas issuing from the top of the furnace contains about 11 p.c. CO<sub>2</sub>, 27 p.c. CO, 2 p.c. H<sub>2</sub>, and 60 p.c. N<sub>2</sub>. The calorific value is about 95 B.Th.U. per cu. ft.; air in the proportion by volume of 0.7 to 1 of gas is required for combustion. The gas can be used for steam raising, furnace heating, and driving gas engines; but to secure high temperatures both gas and air must be preheated.

Like producer gas, blast furnace gas contains a great deal of dust, which must be removed, particularly if the gas is required for gas engines.

**WATER GAS.** This is a valuable agent for the preparation of hydrogen, for mixing with coal gas to meet peak loads in town gas supply, and for the synthesis of compounds such as methanol. It is made by passing steam over red-hot carbon or coke. It is made chiefly for mixing with coal gas as necessary, to form the town gas sold to consumers. It is made in large generators, and the products are derived from a combination of two reactions:



The first reaction takes place at about 1,000° C., the second at a

lower temperature. The second, or true water-gas reaction, is of great value in the production of industrial hydrogen, but is undesirable for fuel gas. Blowing steam over the red-hot fuel cools the bed. Plants have been developed which automatically control the cycle of steaming and air blowing, to maintain an adequate temperature and a satisfactory yield of products.

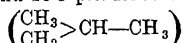
To increase the calorific value of water gas, gas oil is volatilised in a carburetter. The oil is cracked to simpler hydrocarbons, enriching the product, which is called carburetted water gas (C.W.G.) as distinct from normal or blue water gas (B.W.G.), so called because it burns with a blue flame.

Typical analyses are:

	B.W.G.	C.W.G.
CO <sub>2</sub>	3.0	3.7
CO	42.3	34.8
H <sub>2</sub>	49.3	37.3
CH <sub>4</sub>	0.3	9.0
N <sub>2</sub>	4.2	5.9
O <sub>2</sub>	—	0.4
C <sub>2</sub> H <sub>6</sub>	—	1.5
Unsaturated hydrocarbons (C <sub>n</sub> H <sub>m</sub> )	—	7.4
C.V.		
B.Th.U. per cu. ft.	285	495

**PETROL-AIR GAS.** Petrol-air gas or air gas or carburetted air is made by charging air with the vapour of a liquid hydrocarbon. The plant consists of a generator in which an air-stream produced by mechanical means is led into a carburetting chamber where it is charged with petrol vapour at a constant rate. Care has to be taken to keep the mixture outside the lower and upper explosive limits of petrol and air (8 p.c. and 12 p.c. respectively). It is little used nowadays. It is chiefly of value where coal gas is not available, as the plant can be self-contained and comparatively easily assembled. One method of production is to drip oil on to red-hot bricks and charge air with the resulting cracked vapours. The gas has a calorific value of about 800 B.Th.U. per cu. ft.

**BUTANE.** Butane ("Calor Gas") (CH<sub>3</sub>—CH<sub>2</sub>·CH<sub>2</sub>—CH<sub>3</sub>) compressed to a liquid under a pressure of 25 lb. per sq. in. is sold in steel containers. The approximate composition is 5 p.c. propane (CH<sub>3</sub>—CH<sub>2</sub>—CH<sub>3</sub>), 77.6 p.c. butane, and 16.5 p.c. isobutane.



The calorific value is 3,260 B.Th.U. per cu. ft. The pressure is reduced

to normal (2–4 ins. w.g.) by an adequate spring-loaded high pressure governor. Each container holds about 28 lb. butane, of a heating value of about 6½ therms. It is particularly useful in districts remote from a town gas supply and in caravans. Its use in yachts is dangerous, for it has a higher density than air, and if there is any leakage the escaping gas collects in the bottom of the cabin.

It is also distributed as a butane-air mixture through some town supply systems.

**NATURAL GAS.** This is given off from petroleum oilfields. It is evolved in prodigious quantities in the U.S.A. and Canada, and small quantities are found in England near Heathfield, Sussex. The gas is tapped at pressures up to 40 atmospheres, which is of advantage in distribution since many of the large oilfields in America are up to 1,000 miles from the gas consumers, and a pipe-line has to be laid connecting the two regions. It is much used in America, where it forms 93 p.c. of town gas supplies.

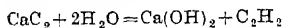
Initial composition varies considerably, depending on the well and the quantity drawn from a particular source, but typical analyses are:

	Birmingham.	Los Angeles.
	Alabama	California
CO <sub>2</sub>	nil	6.5
CH <sub>4</sub>	90	77.5
C <sub>2</sub> H <sub>6</sub>	5.0	16.0
N <sub>2</sub>	5.0	nil
Calorific Value		
B.Th.U. per 1,002 cu. ft. gross		1,073

The areas in the U.S.A. in which natural gas is found cover a wide field from Texas to the Rocky Mountains, and each field has its own characteristics. In the gases from the Appalachian field, for instance, paraffin hydrocarbons predominate, while CO<sub>2</sub> is high in the Rocky Mountain gases. Alberta is the chief source of natural gas in Canada. The olefin hydrocarbons, carbon monoxide, and hydrogen are not present in American natural gases. Natural gas is substantially methane, and is an important source of the chemicals used in making synthetic rubber and plastics.

**ACETYLENE.** This is a supremely important chemical because, apart from its use as a fuel, it is the starting point of a host of compounds from which are derived synthetic rubber, plastics, dye-stuffs, drugs, etc. The most

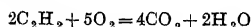
convenient and practical method of producing acetylene is by the action of water on calcium carbide as follows :



An alternative method which gives a good yield is to pass hydrocarbon gases rapidly through an electric arc or oxygen-fed flame and cool the products quickly. Another way is to form an A.C. arc in heavy oil, the gases evolved consisting of hydrogen and acetylene, which can be separated. Acetylene can also be made from methane by the use of the high tension arc.

Acetylene is easily liquefied (at 0° C. the liquid has a vapour pressure of 25 atmospheres), but it is extremely unstable in this state, and storage and transport of liquid acetylene can be effected only by compressing the gas to 15 atmospheres at 60° F. into cylinders which have been filled with porous material such as kapok or charcoal. The function of the absorbent is to divide the cylinder into a number of small cells so that in the event of any ignition or decomposition the effect is localised and there is no general propagation of flame or explosion throughout the mass. This is how acetylene is used for oxy-acetylene flames for welding, metal spraying, etc. The acetylene is dissolved first in acetone under pressure to increase the capacity of the cylinder, since 1 cu. ft. of acetone will dissolve 275 cu. ft. of acetylene at 15 atmospheres pressure.

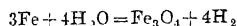
Acetylene has a calorific value of about 1,500 B.Th.U. per cu. ft. and is one of the most powerful combustibles known. The temperature of the hottest spot of an acetylene flame, i.e. the tip of the white cone, is about 3,500° C. The equation for combustion with oxygen is :



Acetylene is much used as an illuminant, particularly in portable installations. Its light is the nearest approach to sunlight known.

**HYDROGEN.** Hydrogen also is a valuable agent in the chemical industry, apart from its use as a fuel in, for instance, the oxy-hydrogen flame. During the Second Great War the gas industry made hydrogen in vast quantities for barrage balloons. It is made commercially by electrolysis, or more readily and cheaply by a modification of the steam iron

process. In the simplest form, steam is passed over red-hot iron when the following reaction takes place :



In large scale production in a gas works, preheated water gas is passed over a bed of iron ore contained in a generator and maintained at 800–1,000° C. The ore is reduced to iron and preheated steam is passed over it. The process is similar to that for making water gas, consisting as it does of alternate periods of blowing, with water gas substituted for air, and steaming to produce the desired product. A series of equilibrium reactions is set up, involving the reduction of FeO and Fe<sub>3</sub>O<sub>4</sub> with H<sub>2</sub> and CO, and close control is maintained to ensure that the reaction proceeds the right way. The purity of the product is about 99 p.c.

OIL GAS is becoming increasingly important in Europe as coal supplies diminish and gas consumption increases. Methods of manufacturing permanent gas from heavy petroleum, usually depending on the partial combustion of the oil by a restricted air supply, began to be developed in 1940, particularly in Great Britain, and by 1957 formed a useful addition to peak load supplies. But the proportion that can be mixed into town gas supply without upsetting the performance of gas-burning appliances is limited to a maximum of about 20 p.c.

TAIL GASES from oil refineries, available in substantial quantities in Great Britain as a result of the enormous increase in the volume of crude petroleum distilled there since 1946, consist essentially of methane, ethane, propane, and butane, and are piped to gas works, re-formed by heat treatment into gases more suitable for existing gas appliances, and used to supplement coal gas supplies.

**UNDERGROUND GASIFICATION OF COAL**, though much publicised, has not proved very attractive commercially. It is a method of mining rather than of gas manufacture, and only low grade gas and sensible heat, suitable for power generation on the site, have been recovered. The thermal efficiency of the process is low, and it is applied only to seams that are too thin or dirty to be worth recovering as coal by traditional methods.

**Gascoigne.** (GEORGE (c. 1525–77). English poet. Born at Cardington, Beds, and educated at



George Gascoigne,  
English poet

Cambridge and the Inns of Court, he was M.P. for Bedford. A notable proscriber, he fought in the Low Countries, took part in the famous festivals at Kenilworth and Woodstock to provide entertainment for Queen Elizabeth I, and died at Stamford, Oct. 7, 1577. To him is due the first English prose comedy, *The Supposes*, 1566 (an English adaptation of Ariosto's *Gli Suppositi*), which supplied the sub-plot of Shakespeare's *The Taming of the Shrew*. In collaboration with Francis Kinwelmersh he wrote the second English tragedy, *Jocasta*, 1566 (from an Italian version of Euripides' *Phoenissae*); one of the earliest English satires in blank verse, *The Steel Glass*, 1576; the first critical essay on English versification, *Certain Notes of Instruction in English Verse*, 1575; and *Ferdinando Jeronimi*, 1572, probably the first English imitation of the Italian novella.

Several modern editions of his works have been published, e.g. one in 1907 edited by J. W. Cunliffe. Consult also *Life and Writings*, F. E. Schelling, 1894.

**Gascoigne.** SIR WILLIAM (c. 1350–1419). English judge. He was made one of the king's serjeants in 1397, and chief justice of the king's bench in 1400, enjoying a high reputation for impartiality and fearlessness. He is said to have refused Henry IV's request to pronounce sentence on Archbishop Scrope, who was implicated in Hotspur's insurrection; and is supposed to have committed Prince Hal to prison for striking him in court (cf. Shakespeare's *Henry IV*, part 2): whatever the truth of this, he either retired or was dismissed from his post soon after Henry V became king.



Sir William  
Gascoigne,  
English judge

**Gascony.** One of the old provs. of France. Bounded on the W. by the Atlantic, Gascony lay contiguous with Languedoc and Foix on

the E., with Navarre and Béarn on the S., and with Guienne on the N. Gascon territory would thus fall within the modern depts. of Landes, Hautes-Pyrénées, Gers, and parts of Haute-Garonne, Lot-et-Garonne, Ariège, and Tarn-et-Garonne.

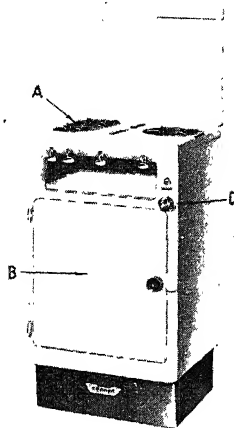
The name comes from that of the Iberian tribe of the Vascones, who invaded the Roman prov. of this district, known as Novempopulana, between 580 and 590, and settled there in considerable numbers. After an unsuccessful invasion by the Frankish king Chilperic, Gascony (Vasconia) was invaded by Thierry II of Burgundy, and Theodebert of Austrasia, in 602, and Duke Genialis was nominated over the province. The people retained a great measure of independence, establishing a ducal dynasty of their own. By 819, Frankish dukes were ruling. A duke Totilus is mentioned as receiving Gascony from Louis I the Pious, and among his successors were Séguin, William, and Arnaud, on whose death, in 864, the Gascons restored Sanchs, one of their old line. His descendants held the crown until c. 1073, when Gascony became merged in Aquitaine.

Eleanor, daughter of William X duke of Aquitaine, brought Gascony as a part of her dowry to Prince Henry of England, later Henry II, in 1152. It thus became part of the English possessions in France. It was governed for a time by Henry's sons Richard and John successively, but its history continued to be closely linked with that of Aquitaine. Simon de Montfort was the most notable of the English governors, 1248-52. There was much internal dissension, the Gascon nobility inclining towards the French allegiance, while the merchant classes favoured the English connexion. The peace of Brétigny, 1360, assigned Gascony definitely to Edward III, with Aquitaine, and Edward in return abandoned all claims to the French crown. It was a storm centre of the Hundred Years' War, and in 1453 united finally with the French kingdom.

The Gascon dialect, which is believed to have changed very little from its medieval form, still prevails in the district. It exercised a considerable influence on the development of the French language during the 16th century, especially through several distinguished writers of Gascon origin, notably Montaigne, and by the infusion of many Spanish and Provençal words and expressions. The ex-

uberant and vaunting character of the Gascon people is proverbial throughout France, the term *gasconnade* being applied to bragging, flamboyant speeches or actions. See Aquitaine: France.

**Gas cooker.** Appliance heated by gas and intended for cooking foods in any desired manner.



Gas Cooker. A, hotplate with boiling burners and grill; B, oven; C, control dial of oven thermostat  
*Courtesy of Cannon Iron Foundries, Ltd.*

Sizes and types range from those in family use to very large cookers for canteens, restaurants, etc. The cooker consists of two main parts: (1) a hotplate containing burners for boiling, simmering, frying, and a grill burner for grilling, broiling, toasting, etc. About 70 p.c. of the gas used for cookers is consumed by the hotplate. Hotplate burners can be adjusted by taps to give the desired heat. (2) An oven, consisting of a chamber insulated by slag wool, aluminium foil, air space, etc., and heated by one or more gas burners. In most designs, the temperature of the oven is maintained at any desired level by a thermostat which may be of the expanding rod or liquid bulb type. Some ovens have glass doors so that the food can be seen during cooking without opening the door and wasting heat.

Gas cookers are classified into three types according to the relative arrangements of the oven and hotplate. These are (1) vertical type, having the hotplate fixed above the oven; (2) range type, having the oven by the side of the hotplate with its top level with the latter; (3) raised oven type, having the oven by the side of the hotplate but with the bottom of the oven level with the top of the hotplate. The finish is

usually of vitreous enamel for easy cleaning.

**Gascoyne.** River of W. Australia, which rises in three head-streams, near the Carnarvon Range, in the N.W. division, and flows in a generally W. course of 300 m., to empty into Shark Bay, near Carnarvon.

**Gas-Discharge Tube.** Electric lamp in which the light is obtained from an electric discharge between the electrodes in an evacuated glass tube containing a gas. Neon gas gives an orange-red light; argon, pale violet; mercury vapour, blue; and helium, ivory white. See Neon Lighting.

**Gas Engine.** In all types of engine, steam engines and turbines, gas engines, petrol engines, oil engines and gas turbines, heat is developed by the combustion of fuel, and the object of the engine is to convert as much as possible of the heat thus developed into useful work. In the steam engine part of the heat developed is expended in producing steam in a boiler, the remainder escaping in the flue gases, so that only 60 to 80 p.c. passes on to the engine or turbine; which, again, can convert only a fraction of the heat supplied to it into work, the remainder passing out in the exhaust steam.

In the gas engine the generation of heat takes place in the cylinder, thus eliminating the boiler and its losses, and for this reason it is referred to as an internal combustion engine. The discovery of coal-gas by Murdock at the end of the 18th century, and its distribution for illuminating purposes, turned the minds of inventors towards its use for power generation, but earlier attempts had been made to produce an engine depending on generation of heat inside the cylinder.

About 1680 the French scientist, the Abbé d'Hautefeuille, and the Dutch mathematician, Christian Huygens, both suggested a form of engine in which the power was to be derived from the explosive energy of gunpowder. A century later an English patent was granted to John Barber for what he called an "exploder," in which he proposed to explode a mixture of hydrocarbon gas and air, and in that way develop motive power; and in Barber's specification is the first suggestion of the gas engine of which there is any record.

It was not until 1360 that another French inventor, Étienne Lenoir, designed a practical en-



gine, of which several hundreds were made in France and the U.K., although it was of limited power, and consumed much gas—over 140 cu. ft. per horse-power hour. Two years later another French scientist, Beau de Rochas, proposed the adoption of the principle of compressing the mixture of gas and air before exploding it in the engine cylinder, and suggested the working "cycle" which has since been generally adopted. Improvements were added to Lenoir's design by Nicholas Otto and Eugen Langen, and in 1878 the former embodied the principle of compression which had been suggested by Beau de Rochas in a design for an engine which was the first to attain real success.

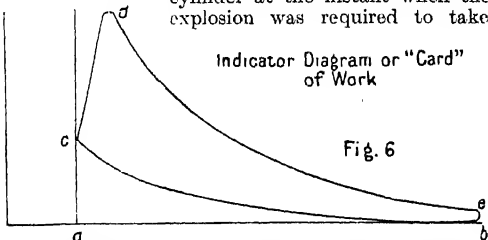
The principle of the Otto engine may be readily understood by reference to the indicator diagram and Fig. 1. The engine works on a four-stroke cycle, i.e. there is one impulse (explosion) in the engine cylinder to every four strokes of the piston, two forward and two back, or in two complete revolutions of the crank. The cycle is made up of the following move-

ments: (1) the piston advances from A to B, drawing in as it moves the mixture of gas and air. (2) The piston returns to the other end of its stroke, and in doing so compresses the air and gas. This movement is represented by the line  $b\ c$ , the height of  $c$  above the line  $a\ b$  representing the degree of compression. (3) The mixture is exploded, and the piston advances a second time, driven forward by the force of the explosion. This movement is represented by the line  $c\ d\ b$ , the height of  $d$  above the line  $a\ b$  indicating the maximum pressure upon the explosion of the mixture. (4) Finally the piston returns from B to A, and drives out as it moves the waste gases resulting from the combustion of the original charge.

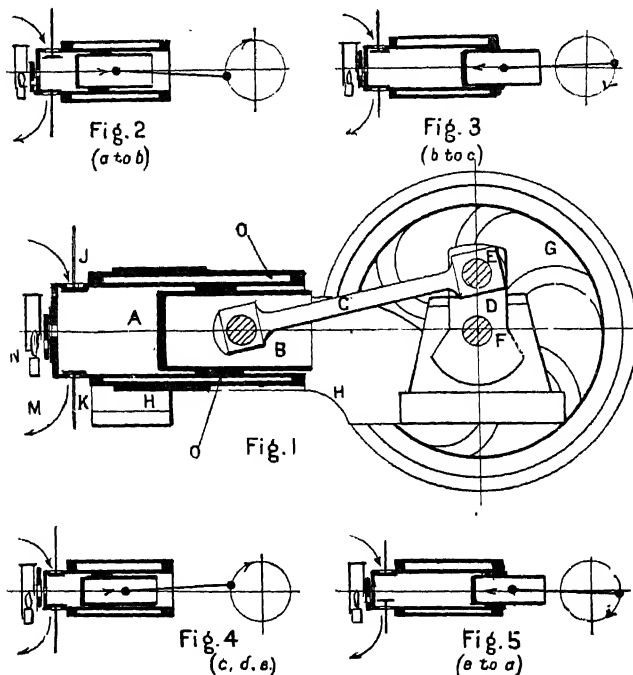
The fact that only one power stroke takes place in every four strokes of the engine or two revolutions of the crank

makes it necessary to fit heavy flywheels to single crank engines, since these have to store up the excess power during the explosion stroke by increase of speed and deliver this power to the shaft by a continuous decrease of speed during the remaining three strokes. The heavier the flywheel and the higher the speed, the smaller is the percentage change of speed to deliver a given amount of power. With multi-crank engines, running at a higher speed, more power strokes take place per revolution and smaller flywheels are required.

The earliest method of ignition was by a small gas flame which registered with a hole in the cylinder at the instant when the explosion was required to take



Gas Engine. Indicator diagram, showing varying pressure of gases in cylinder. For explanation, see text



Gas Engine. Typical 4-cycle gas engine. Fig. 1. A, cylinder; B, trunk piston; C, connecting-rod; D, crank; E, crank-pin; F, crank-shaft; G, flywheel; H, framing; J, gas and air inlet valve; K, outlet valve for burnt gases; M, flame slide valve; N, ignition gas flame; O, water jacket. Fig. 2. First stage of cycle, drawing in gas and air,  $a$  to  $b$  in indicator diagram. Fig. 3. Second stage, compression of gases,  $b$  to  $c$  in indicator diagram. Fig. 4. Firing of gases,  $c$ ,  $d$ ,  $e$  of indicator diagram. Fig. 5. Fourth stage, driving out burnt gases,  $e$  to  $a$  of indicator diagram. See text

place. This involved a rather cumbersome slide and it was difficult to prevent leakage under pressure. To replace it came a porcelain tube heated by an external flame and a small valve which admitted some of the charge to the inside of the tube at the right moment. Improved electrical devices enabled the hot tube to be replaced by either a low tension magneto (for large slow speed engines) or a high tension magneto (for smaller engines running at higher speeds). This also enabled the timing of the explosion to be adjusted.

Since the power required from an engine will vary according to the external load, a governor is required to adjust the supply of gas-air mixture to the demand. This may be accomplished (a) by cutting out explosions; (b) by throttling the mixture; (c) by altering the amount of gas entering per power stroke. But (a) suits only quite small engines, since it produces considerable speed fluctuations; and (c) is unsuitable for small loads, as it leads to erratic combustion.

Commercial coal-gas is convenient as a fuel where a supply is available, and it has a high heating value; but it is relatively costly. Producer gas, generated in either pressure or suction pro-

ducers, is much cheaper, and, until the advent of reliable oil engines, was widely used. Much higher compression is required, since the heating value per cu. ft. of producer gas is only one-fourth that of ordinary coal-gas.

Gas produced as a result of reactions in the blast furnace, containing a large percentage of carbon monoxide, is suitable for gas engines after cooling and cleaning. Engines in iron and steel works are often run on it.

Could an engine be designed in which an explosion would take place at every revolution, double power might be obtained from an engine of a given size, and a more equal turning movement would result. This end was obtained by Dugald Clerk in 1886 by his invention of a two-stroke engine, in which he introduced an extra cylinder, the purpose of which was to draw in and compress the charge and to sweep out the burnt gases from the power cylinder by a blast of air. The principle of the Clerk cycle has been embodied in large gas engines today, some of which have an individual rating of 5,000 h.p., a capacity which it would be difficult to reach in engines of four-stroke type.

#### Amount of Gas Consumed

The consumption of coal gas in small engines has been reduced to as little as 14 cu. ft. per brake horse-power hour; on Mond gas, experiments have given a consumption of 66 cu. ft. per brake horse-power hour in an engine developing 750 h.p.; while a full load of 1,200 brake horse-power has been developed with a consumption of 102 cu. ft. of blast-furnace gas per brake horse-power hour. The calorific values of the three gases are roughly 550, 140, and 105 B. Th. U. per cu. ft. respectively.

The high temperatures reached by the exploded mixture in the engine cylinder of a gas engine make it necessary to cool the walls of the cylinder, and also in large engines the piston, by circulating water around or through them. Sometimes the heat in the cooling water and the exhaust gases is utilised for generation of steam for special purposes. Owing to the extra cost of the plant required, this is practicable only on a large scale. Small steam engines convert only from 5-10 p.c. of the heat of the fuel into useful work; large modern reciprocating steam engines seldom more than 15 p.c. The gas engine,

however, can convert over 30 p.c. of the heat in the gas to useful work.

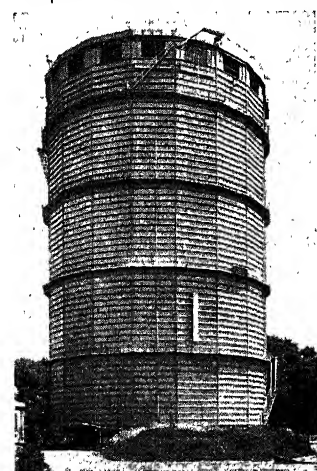
A. T. J. Kersey, M.I.Mech.E.

**Gas Gangrene.** Disease due to the infection of a wound by a variety of organisms. It begins as a darkly discoloured localised swelling which gives crepitation on pressure. Treatment lies with the administration of antitoxin and possibly with surgery.

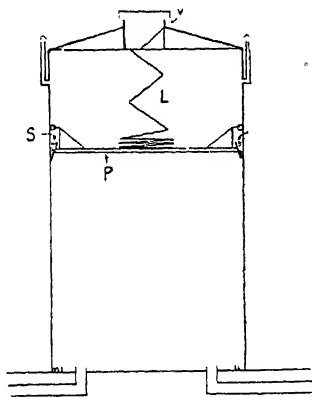
**Gas Heater.** The various types, including the gas fire, are considered under Gas Stove.

**Gas Holder.** Container, popularly known as a gasometer, in which gas is stored after manufacture for distribution to consumers. A secondary but important function is the maintenance of a satisfactory pressure for purposes of distribution. Gas holders may be located either on the site of the works where the gas is produced or at a centre of population; thus one gas producing works may feed three or four gas holder stations. Gas holders are of three principal types: waterless, water-seal, and high pressure.

The waterless type (Fig. 1), widely used on the Continent, was finding increasing favour in the U.K. before 1939. It consists of a cylindrical steel shell, which may be up to 200 ft. in diameter and 300 ft. high (holding some 8,000,000 cu. ft.) in which slides a piston making close contact with the internal walls of the shell. Gas under pressure is introduced below the piston, which rises and falls according to the quantity of gas in storage. A special sealing mechanism maintains a gas-tight joint between the piston and the walls of the



Gas Holder. Fig. 1. Example of the waterless type, with a capacity of 1,500,000 cubic ft.

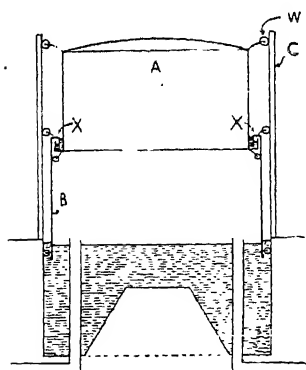


Gas Holder. Fig. 2. Section of a waterless gas holder. A, gas inlet pipe; B, gas outlet pipe; P, piston; S, tar seal; L, telescopic ladder; V, vent to atmosphere

holder, and tar of suitable consistency is pumped to the top of the holder and allowed to run down the inside walls to form the seal. The advantage of this type of holder is that the piston maintains a steady pressure on the gas, irrespective of the quantity being stored, and the total contents can be used. The space in the holder above the piston is in communication with the atmosphere through a vent in the roof, and so contains air, which enters or leaves as the piston moves (Fig. 2).

The water-seal type of holder is a cylindrical vessel of riveted iron plates, closed at the top and open at the bottom, with the lower part immersed in a tank of water of such a depth that the holder can be almost completely submerged when it is empty. Usually there are two or more annular sleeves, known as lifts, the upper one of which is roofed with light gauge steel plates to form the crown of the holder. The remaining lifts are open at both ends and move telescopically one within the other with the variations in the quantity of gas in the holder.

The tank in which the gas holder floats is a circular brick, concrete, steel, or cast-iron water reservoir, often built below ground level (Fig. 3). Where the considerable amount of excavation required is not possible, the water tank is built up of steel plates above ground level. The capacity of the tank ranges from 500,000 to 12,000,000 gallons of water. Gas is fed into the holder through an inlet pipe, the mouth of which is above the level of the water in the tank. The pressure of the gas acts on the crown of the top lift



Gas Holder. Fig. 3. Column-guided water seal type. A, B, moving lifts; X, water-seal; C, guiding columns; W, rollers

and causes it to rise as the quantity introduced increases. When it has moved to its full height an annular ring around the bottom periphery engages a ring on the next lift, which in turn rises and engages a further lift until the full height of the holder has been reached. The water in the tank, acting as a seal, prevents the gas from escaping from the bottom of the holder. The joints between the various lifts are rendered gas-tight by a water seal in the annular channel at the bottom of each lift. Gas is expelled from the holder through an outlet pipe.

The pressure at which gas is stored may be only a few oz. per sq. in., and depends on the number of lifts in use; a full holder creates a greater pressure than one nearly empty, owing to the extra sections whose weight is taken by the gas. Since such fluctuations are undesirable, it is usual to pass the gas, after it has left the holder, through a station governor, which maintains a constant pressure in the mains.

The lifts of a holder may be either column- or spiral-guided. The column-guided holder (Fig. 3) moves by rollers attached to the upper part of each lift and working against guides fitted into a series of vertical columns spaced round the periphery of the holder. These columns may be made of cast-iron or of steel lattice girder construction, and are normally mutually strengthened and braced by wrought iron tie rods. The spiral-guided holder (Fig. 4) is also telescopic and works on exactly the same principles, except that the several lifts are maintained in their correct relative position by a series of guides which are attached spirally to the sides of the indi-

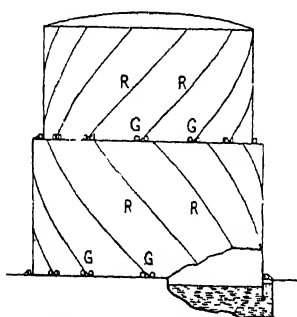
vidual lifts and cause each section of the holder to rise and fall with a screw-like action.

High pressure holders are built from heavy iron plate in the form of spheres or dome-ended cylinders to operate at up to 50 pressures per sq. in. Compared with other types, for the same gas capacity they are cheaper to build and maintain, and much smaller and so more easily toned in with their environment, but there is some loss when gas is stored under high pressure owing to condensation of hydrocarbons.

**Gaskell, ELIZABETH CLEGHORN** (1810-65). British novelist and biographer. Daughter of William Stevenson, she was born at Chelsea, Sept. 29, 1810, and brought up by an aunt at Knutsford. She married in 1832 William Gaskell, a Unitarian minister and professor of English literature at Manchester. A first novel, *Mary Barton*, 1848, dealt with working class conditions in Manchester. It won praise from Dickens, who invited its author to contribute to *Household*



Words. The result was the appearance as a serial in 1851-53 of *Cranford*, that vignette of a small country town, inspired by Mrs. Gaskell's memories of Knutsford. Other novels included *Ruth*, 1853; *North and South*, 1855; *Sylvia's Lovers*, 1863; and the unfinished *Wives and Daughters*, published posthumously in 1866. In 1857 she published one of her most important works, her *Life of Charlotte Brontë*, which was based on her friendship with Charlotte and her family, and was the first biography of that novelist, upon which all others drew. She died Nov. 12,



Gas Holder. Fig. 4. Spiral-guided water-seal type. R, guide rails; G, guides

1865, near Alton, Hants, and was buried at Knutsford. Biographies of Mrs. Gaskell are by C. K. Shorter, 1908; E. K. Chadwick, 1913; S. Whitfield, 1923; G. Payne, 1930; G. de W. Sanders, 1930; E. Haldane, 1930. Her *Letters to Charles Eliot Norton*, ed. J. Whitehill, appeared in 1932.

**Gasket.** Rope yarn used for making joints in spigot and faucet pipes. The yarn is rammed well into the joint, and melted lead is then poured in and caulked to complete the joint. It is also a cord or rope, of which the ends of the strands are plaited, secured to a ship's yard, to which a sail is fastened.

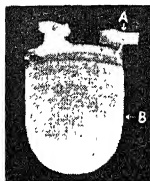
**Gaskins.** Term applied to leggings; packings of hempen cord or rope; part of the thighs of a horse. The word originally denoted the leather hose or breeches of the 16th century, also known as galligaskins.

**Gaslight Paper.** Paper, used for printing photographs, of such sensitiveness to light that the exposure behind the negative and the development of the invisible image thus produced can be done both by gaslight and equivalent illumination. Gaslight printing offers advantages to amateurs because it does not necessitate the use of a dark room. It was introduced in America about 1897.

**Gas Liquor.** Ammoniacal liquor formed from the aqueous distillate condensed from gas made by carbonising coal, mixed with the effluent from the ammonia washers. Condensation starts in the hydraulic main and continues in the condensers. The residual ammonia is washed from the gas and the solution added to the condensate. Ammonia is combined with chloride, sulphate, carbonate, sulphide, etc., and the liquor also contains cyanogen compounds, tar acids, and tar bases. It may be used directly as fertiliser, but it is usual to distil off the ammonia for conversion into sulphate or ammonium hydroxide.

**Gas Mantle.** Appliance for gas lighting. The incandescent gas mantle is based upon the conversion of energy in the form of heat to energy in the form of light. Substances which radiate a high proportion of imparted heat energy in the form of light are therefore needed. The rare earths, thorium and ceria (oxides respectively of thorium and cerium), are the principal sources. Invented by Karl Auer von Welsbach in 1884, the gas mantle was first produced commercially in 1886. Gradual improvement led to the

inverted gas mantle, dome shaped for use with low pressure, and elongated thimble shaped for use with high pressure, gas supplies: the differing shape of the mantle conforms roughly to the differing natural contour of the flames produced; the size required depends upon the size of the burner.



Gas Mantle. Inverted mantle. A, clay ring supporting mantle; B, mesh

A mantle is made by knitting an appropriately shaped bag from artificial silk. The open end is bound by asbestos thread to a fireclay holder ring, and the fabric is impregnated with a solution of the nitrates of thorium and cerium, mixed in the proportion of 99 to 1 (found by experience to be the best proportions), and dried. When dry, the mantle is burnt to convert the nitrates to oxides, and then dipped in collodion solution, which gives it sufficient strength for handling and transport. The collodion burns out when the mantle is first used.

**Gas Mask.** See Respirator.

**Gas Meter.** Instrument for measuring gas. Gas meters are of several kinds, but the principal types are the wet and the dry. The former consists of two cylinders with their axes horizontal and concentric, one arranged to revolve inside the other. The revolving cylinder is divided into four compartments and works in liquid which reaches just above the axle. Gas is admitted into each compartment in succession, and in entering drives the cylinder round and raises the compartment out of the liquid. The movement is recorded by gear train actuated by the revolving axle and provided with dials and clock hands which indicate the number of thousand

feet of gas consumed. This type of meter is accurate and is used as a standard. Wet meters are still in use for gas works measurements, and outside the U.K. for consumers, the sealing medium then being oil. But they are giving place to the semi-positive rotary dry meter for works practice and to the bellows dry meter for consumer use.

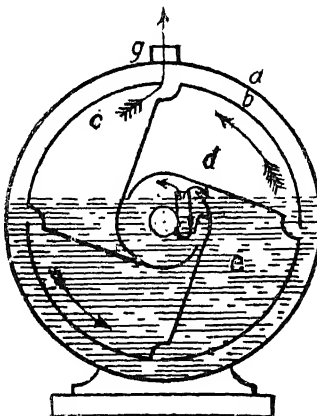
The works dry meter consists of two rotors, each of cross section approximating to a figure 8, housed inside a casing, and accurately machined so that as they revolve in opposite directions the clearance between the two and between each and the casing is sealed by the lubricant.

The dry meter used to measure consumption consists of a pair of bellows of cylindrical shape filled and emptied alternately by the pressure of the gas itself, the movements being recorded as in the wet meter. Accuracy, performance, etc., are controlled and the public protected by the Sale of Gas Act.

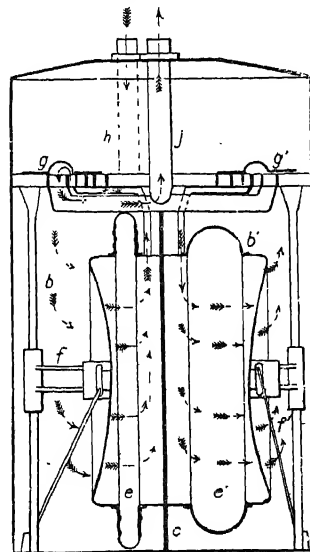
**Gas Oil.** Petroleum distillate used for making gas. It has a boiling range intermediate between that of kerosene and the lightest lubricating oil fractions. The primary use of gas oil is for oil-gas processes and for carburetting water gas. It is also used as a fuel

for compression ignition engines (Diesel fuels) and for small domestic boilers. Large quantities are used as absorber oil in the recovery of casinghead gasoline from natural gas and in the recovery of benzol and naphthalene from coal gas.

**Gasoline.** Refined petroleum distillate, boiling between 30° and 220° C. and used as a fuel in internal combustion engines, usually of the spark ignition type. Gasoline is produced in five ways: (1) By absorption and condensation processes from the natural gas associated with petroleum (natural gasoline; casinghead gasoline). (2) By continuous distillation and fractionation of crude petroleum (straight run gasoline). (3) By cracking of petroleum distillates and residues. (4) By the use of natural gas, the gaseous by-products of cracking, of water gas, etc., either as the original mixtures

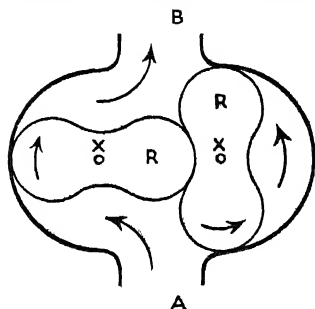


Gas Meter. Above, wet meter: a, casing; b, revolving drum to compartments (arrows show direction of rotation); c, compartment filling with water which is driving out gas; d, compartment just filled with gas; e, compartment beginning to be filled with gas; f, gas inlet; g, gas outlet. Right, dry gas meter: a, casing; b b', measuring compartments divided by diaphragm c; e e', bellows worked by pressure of gas (e is collapsed, and e' is distended, movement then beginning to be reversed); f f', levers attached to bellows, and moving with them to let gas in and out of compartments; g g', valves; h, gas inlet; j, gas outlet



or separated into the individual gases, for the synthesis of gasolines by alkylation, polymerisation, hydrogenation, the Fischer-Tropsch process, etc. (5) By treatment of coals and coal products by carbonisation and hydrogenation. Chemical stability is assisted by the addition of minute quantities of cresols, xylenols, etc., which inhibit the formation of gummy products.

**Gasometry or Gas Analysis.** Branch of chemical analysis. It is used for estimating the purity of simple gases, for testing the composition of illuminating gas, the efficiency of pyrites roasting fur-



Gas Meter. Semi-positive dry meter. B, R are the rotors; A the gas inlet; B the gas outlet; X, X the rotatural axes

naces, and the wholesomeness of the air of dwelling-houses. Carbonic acid gas is absorbed entirely by a fixed caustic alkali such as potassium hydroxide.

Automatic methods have been devised for use by the technical chemist in analysing coal gas. He tests for (1) carbon dioxide; (2) ethylene and benzene; (3) oxygen; (4) carbon monoxide; (5) hydrogen and methane; (6) nitrogen.

A measured quantity of coal gas is passed in turn through (1) potassium hydroxide; (2) bromine or fuming sulphuric acid; (3) an alkaline solution of pyrogallol, sodium hyposulphite, or phosphorus; (4) ammoniacal cuprous chloride, followed by dilute sulphuric acid. These processes remove the first four constituents, and measurement of the changes produced in each process enables the chemist to determine the quantity of each substance in the sample of gas. The remainder of the sample is then tested for hydrogen and methane, either by combustion with oxygen over palladium asbestos or by explosion, and the final residue is nitrogen.

Physical methods are also employed for testing the purity of gases; e.g. the change of refractive index, or of thermal conductivity, of a gas due to the presence of "adulterants" has been utilised for this purpose.

**Gasparin, VALÉRIE BOISSIER, COMTESSE DE (1813-94).** French writer. Born at Geneva, she married Count Agénor de Gasparin, a politician prominent in the French Protestant movement, whose views she shared. She wrote books on religious and social themes, notably *Le Mariage au Point de Vue Chrétien*, 1843, and *Il y a des Pauvres à Paris*, 1846 (both awarded the French Academy's Montyon prize). Other works are: *Livre pour les Femmes Mariées*, 1845; *Les Horizons Prochains*, 1858; *Les Horizons Célestes*, 1859, in translations the best known of her books; and *L'Armée du Salut*: *Lisez et Jugez*, 1883 (on the work of the Salvation Army). She translated some of Dickens into French. She died at Geneva, June 29, 1894.

**Gasparri, PIETRO (1852-1934).** Italian cardinal. Born at Ussita May 5, 1852, he became professor of canonical law at the Paris Catholic Institute, 1880-98. After three years in S. America as apostolic delegate, he was in 1904 commissioned by Pius X to codify the canonical law, and in 1907 became a cardinal. As secretary of

state to the Vatican throughout the First Great War and until 1930, he negotiated its concordat of 1929 with the Italian fascist government. Gasparri died of pneumonia Nov. 18, 1934.

**Gaspé.** Peninsula forming the eastern part of the prov. of Quebec, Canada. It lies between the St. Lawrence and Chaleur Bay. The interior is forest land and on the coast are a few fishing villages. There are several mountain ranges and the district is well watered, but owing to the great cold it is thinly populated. The name is also borne by a cape and a bay at the eastern end; on the latter is Gaspé Basin, a fishing centre where Jacques Cartier landed July 24, 1534.

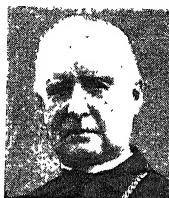
**Gaspé Sandstone.** Siliceous rock containing fossil plants of Devonian age. It is developed in the Gaspé Peninsula, Quebec.

**Gas Poisoning.** In domestic and industrial life, condition due to the inhalation of carbon monoxide. This gas, produced when carbon is burnt in a limited supply of oxygen, if present in breathed air in an amount equal to 0.2 p.c., causes poisoning or destroys life. Charcoal fires and slow combustion stoves may produce the gas; exhaust fumes from motor cars contain 6 p.c. and are a frequent source of accident; but the commonest cause of gas poisoning is an escape of coal gas used for lighting or heating. This may arise from the fumes of blast furnaces and in explosions from coal dust (after-damp). Gas for domestic use is deliberately mixed with other odorous gases so that should it escape it betrays its presence.

Carbon monoxide has some 200 times a greater affinity for haemoglobin than has oxygen. Therefore if breathed it replaces the oxygen in the blood stream. It is also a powerful narcotic poison to the tissues, having a special affinity for the nervous system and the heart muscle. The person attacked presents a characteristic cherry-pink colour. Giddiness, noises in the ears, and vomiting may usher in unconsciousness and complete loss of muscular power. The patient must be removed to a pure atmosphere and given warmth, treatment for shock, and artificial respiration to ventilate the lung.

Gas poisoning in war is described under the heading Chemical Warfare.

**Gasquet, FRANCIS AIDAN (1846-1929).** A British cardinal. Born in London, on Oct. 5, 1846, and



Francis A. Gasquet,  
British cardinal  
Russell

as Henry VIII and the English Monasteries, 1888; *The Eve of the Reformation*, 1900; *Monastic Life in England*, 1904; *Monastic Life in the Middle Ages*, 1922.

In 1896 he was appointed a member of Pope Leo XIII's commission on Anglican Orders. During 1900-14 he was abbot-president of the English Benedictine Congregation, and in 1907 was president of the commission for revision of the Vulgate. He wrote a *Life of Pius XI* on his election as pope in 1922. Gasquet was created a cardinal priest in 1914, and died April 5, 1929.

**Gassendi, PIERRE (1592-1655).** French philosopher and mathematician. Professor of mathematics at the Royal College, Paris, he endeavoured to reconcile the Epicurean, atomistic, mechanical theory of the origin of things with the doctrines of Christianity. He affirmed the immortality of the soul and the existence of an independent first cause. He wrote many philosophic and controversial works, notably on Epicurus and against Descartes, and on astronomy. He died Oct. 24, 1655.

**Gasser, HERBERT SPENCER (b. 1888).** American pharmacologist. Born July 5, 1888, at Platteville, Wis., he studied at the university of Wisconsin and took an M.D. at Johns Hopkins university in 1915. He was professor of pharmacology at Washington university, 1921-31; and of physiology at Cornell Medical College, 1931-35. Appointed director of the Rockefeller institute of medical research, in 1935, and a trustee of the Rockefeller Foundation, he won, with Joseph Erlanger, the Nobel prize for medicine in 1944. The results of their common research had been published as *Electrical Signs of Nervous Activity*, 1937. Gasser also lectured and worked at University College and the National Institute for Medical Research, London, at the Sorbonne, Paris, and at Munich.

**Gasserian Ganglion.** Mass of nerve cells situated inside the skull on the course of the fifth

educated at Downside, he was ordained priest in 1874, and during 1878 was prior of Downside. In 1886 he began that systematic historical research which resulted in such works

nerve. It is now frequently removed, or destroyed by injection of alcohol, in cases of the severe and intractable trigeminal neuralgia known as *tic douloureux*.

**Gas Stove.** A deprecated term popularly used to describe all types of gas appliance for space heating and cooking. (*See Gas Cooker.*) Gas space heating appliances are all defined as either principal heating appliances, intended to provide sufficient warmth for comfortable occupation of a room; or alternative or supplementary appliances, available for principal heating in mild weather, but mainly used to give background heating, remove discomfort, and prevent possible dampness resulting from unheated halls, passages, etc.

Appliances are defined by British Standards as (1) independent hearth fires, *i.e.* free-standing units which can be placed in front of a fireplace with or without decorative surrounds; these heat chiefly by radiation, but some provide also an emission of convected heat by passing a current of air round the back of the heated radiants. (2) Panel fires, comprising a complete unit of the radiant gas fire type fixed into and covering a prepared recess, the bottom of which is above floor level. (3) Inset fires, consisting of a complete unit designed to fit into a fireplace to conform with the shape of the existing brickwork. (4) Fixed fuelless heaters, intended to be permanently installed in a position not connected directly to a flue; often misnamed radiators, most types heating mainly by convection. (5) Portable heaters, with means of attachment to convenient gas points as required; these may give either convected or radiant heat or both. *See Gas.*

**Gas Tar or Coal Tar.** Term used for the black, semi-solid substance which is a by-product of the destructive distillation of coal. It is very valuable, containing the essential constituents of aniline dyes, oils, etc. *See Coal Tar; Dyes.*

**Gastein.** Valley and health resort of Austria, in Salzburg. It lies at a height of about 3,000 ft., fine scenery being provided by the two falls of the river Ache which flows through it. There are several villages in the valley, including Hof-Gastein and Wildbad-Gastein. Wildbad, with its mineral springs, is the chief resort of visitors.

**Gastein, Convention of.** Arrangement between Austria and Prussia, Aug. 14, 1866, about the

occupation of the duchies of Slesvig-Holstein and Lauenburg. After the war with Denmark in 1864 these two powers obtained the duchies jointly, but jealousies developed. Austria, supported by a majority in the diet of the German Confederation, wished to make Frederick, duke of Augustenburg, ruler of Holstein. Prussia objected and prepared to build a naval harbour at Kiel, but a compromise was effected at Gastein. By this Prussia became responsible for Slesvig and Austria for Holstein, while the former country secured Lauenburg for a money payment. This convention, in Bismarck's words, "papered over the cracks," but they soon reappeared, for in 1866 war with Austria broke out.

**Gasteria.** Genus of evergreen succulent plants. Of the family Liliaceae, they are allied to the aloes, natives of S. Africa. The leaves are tongue-shaped or sword-shaped, forming a rosette or in two ranks; the flowers tubular, with some shade of red, disposed in long sprays.

**Gasteromycetaceae** (Gr. *gastēr*, stomach; *mykētēs*, fungi). Large family of fungi of world-wide distribution. The characteristic of the order is that the spore-bearing surface is completely enclosed in a continuous wall (peridium) until the spores are fully developed, when the envelope is ruptured, and the spores set free. It contains the families Phalloideae (stinkhorns), Nidulariaceae (bird's-nest fungi), Lycoperdaceae (puff-balls), etc.

**Gastric Juice.** Fluid secreted by the mucous membrane of the stomach. In the human being it consists of about 99.4 p.c. of water; .3 p.c. of organic substances, chiefly pepsin; .2 p.c. of free hydrochloric acid; .14 p.c. of sodium chloride (common salt); and smaller amounts of other salts. The action of gastric juice is manifold.

(1) It acts as an antiseptic in virtue of its hydrochloric acid, tending to destroy bacteria and prevent putrefactive processes occurring in the stomach; it also helps to keep the chemical reaction of the small intestine at a level which resists invasion of the mucous membrane by bacilli. (2) It acts on cane sugar, converting it into simpler forms. (3) It curdles milk. (4) It splits fat up into simpler bodies. (5) It converts proteid—the principal nitrogenous constituent of animal food—into proteoses which, after further

change into peptones, are absorbed in the process of digestion. (6) It renders iron more malleable for the production of haemoglobin. (7) It contains an enzyme, "the intrinsic factor," which acts on something present in protein food, "the extrinsic factor," to produce a substance stored in the liver which is the normal stimulant for the formation of red corpuscles by the bone marrow. The gastric juice also contains a second enzyme which goes to form a substance essential to the nutrition of the central nervous system.

**Gastric Ulcer.** A bodily disorder, the cause of which, like that of duodenal ulcer, is unknown. It is found in relation with a certain temperament, the meticulous and exact. Toxins swallowed by the mouth or absorbed from septic foci in the body may attack a mucous membrane weakened by the ill-balanced acidity of the gastric juice. Pain and tenderness in the epigastrium come on shortly after eating and are relieved by vomiting or alkalis. Blood may be vomited.

Diagnosis may depend on X-ray findings. Medical treatment is by rest, simple diet regularly given which does not excite the flow of gastric juice, the use of anti-spasmodic drugs, and a high vitamin intake to regenerate the mucous membrane. All sepsis, especially of the sinuses, teeth, and tonsils, must be eliminated. Surgical intervention may be necessary if the condition fails to respond to medicine, as perforation of the stomach wall and malignancy are dangers. In older persons partial removal of the stomach may be needed to prevent recurrence of the ulcer.

**Gastritis.** Inflammation of the mucous membrane which lines the interior of the stomach. Two forms are recognized, acute and chronic. Acute gastritis is a common complaint most often caused by eating unsound or indigestible food, or by excess of alcohol. Gastritis after food poisoning results from bacterial activity. The symptoms of gastric influenza are due to gastritis producing the influenzal toxin. Swallowing irritant gases may also cause gastritis. Irritant poisons may also give rise to acute gastritis.

The symptoms are pain, feeling of distension in the stomach, nausea, vomiting, gaseous eructations, and headache. In severe cases there may be a rise of temperature. The tongue is coated



and diarrhoea may follow if the toxic condition spreads downwards.

The symptoms generally disappear in from one to three days. Medicinal treatment is simple. In most cases a saline purgative should be given after vomiting has been induced. No food should be taken until the symptoms are abating, and then only the lightest diet, such as clear soup, soda water, and dry toast.

Chronic gastritis may follow the persistent eating of unsuitable or indigestible food, or excessive taking of tea, coffee, or alcohol, or the habit of bolting food. The condition may also arise in the course of disease of the stomach such as ulcer or cancer, and it is frequently a secondary result of constitutional disorders such as anaemia, gout, diabetes, etc.

The symptoms are pain in the stomach and sensations of fullness after eating, nausea often most marked on rising in the morning, flatulence, eructations, headache, depression, and lassitude. In prolonged cases there may be marked emaciation. Treatment is general as regards rest and diet, and particular as regards the underlying condition.

**Gastrochaena.** Genus of marine bivalve molluscs, boring into limestone and sandstone rocks. They secrete a kind of tube, shaped somewhat like a flask, which is usually coated with grains of sand. Only one species occurs round the British coasts, the flask-shell (*G. dubia*).

**Gastrocnemius** (Gr. *gaster*, stomach; *knēmē*, leg). Muscle which forms the main part of the calf of the leg. It consists in the upper part of two fleshy masses, one springing from the outer side of the end of the femur and the other from the inner side. These heads of the muscle gradually meet as they pass down the leg, and terminate in a broad tendinous band which is continued as a strong tendon, the tendo Achillis. See Tendon.

**Gastro-enteritis.** Inflammation of the mucous membrane lining of the stomach and intestines. See Enteritis.

**Gastronomy.** Art and science of the pleasures of the table. One of the most ancient and significant symptoms of the progress of civilization, it shows man's development of a primitive need into a selective appreciation of what, in preparation and combination, is best suited for the creation of a pleasant mood and

as a stimulant for the spirit, as well as for physical well-being. The Chinese, the ancient Egyptians and Jews, the Greeks only during their decadence (an epicure is an erroneous term for an advocate of sumptuous living), and later the Romans developed the culinary art; but often their "delicacies" were selected more for rarity and price than for a particular taste.

The Greek poet Archestratos was praised as the "gastronomical Hesiod." Under Augustus such leaders as Lucullus, Hortensius, and Trimalchio dumbfounded their contemporaries by the luxury of their banquets, and Apicius—in whose name one of the earliest cookery books appeared—ruined himself by the expenses of his table. The art of refined cooking, congenial choice of wines and other drinks, selective application of spices, vanished with the Roman empire, though some of its teachings were preserved by monks and clergy through the Middle Ages. With the enriched ingredients brought to Europe in the wake of the Crusades, and the rediscovery of Greek and Latin literature during the Renaissance, gastronomy was ready to develop, especially in Italy and France.

Pope Pius V, in the later 16th century, had a famous cook, Bartolomeo Scappi, author of a book; the French kings, Louis XIV and XV, fostered the art of the table, and statesmen and princes like Colbert and Condé did not disdain to prepare select meals with their own hands. Germany, where a famous cookery book by Rumpolt was published in 1576, came under that Italian and French influence. Great Britain developed the pleasures of the table to a comparatively high degree, if with a small range.

From the 18th century France gained an unassailable reputation as the paradise of gastronomes. At the École des Ragoûts the teachings of the Sieur de la Varenne, noble head cook of the marquis of Uxelles, were laid down in 1726; Frederick the Great, admirer of all things French, praised the school; French courtiers honoured each other's pampered chefs, and philosophers devoted studies to the meaning of refined eating and drinking. Montaigne was the first; Brillat-Savarin, with his still famous *Physiologie du Goût* (1825), the outstanding one. The gourmet Talleyrand had as cook Carême, author of *Le Pâtissier Pittoresque*

and works of psychological and sociological interest. Balthazar Grimod de la Reynière (1758-1837), in his 8-vol. *Almanach des Gourmands*, anticipated most of what has been evolved as the art of stimulating man's vitality and gifts by a well-selected diet, the correct proportions of vegetables and meat, the proper sequence of wines, the adequate application of spices and condiments.

#### National and Regional Dishes

The international importance of gastronomy is its function as a link between nations. Prejudice and seclusion vanish when the pleasures of the table are shared and the proper drinks accompanying them loosen the tongue. A particular national, regional, or local character displays itself in special dishes: *bouillabaisse* at Marseilles, duck at Rouen, tripe at Caen, fish and crayfish *blanquettes* at Lyons, goose-liver pie at Strasbourg, baked lobster in Brittany, cheese and cream in Normandy, chicken and mushroom pie at Dijon. Visitors afterwards associate with their hosts the memory of particular joys of the palate they first experienced in their midst; and subconsciously may be affected in favour of industrial products, schools, scientists, etc., of the place where they had that experience. On the other hand, the appreciation by a foreigner of what is offered in justifiable pride, makes the host inclined to take a favourable view of the guest, and amenable to transact business with him.

The direct consequence of a high gastronomical standard is a prosperous tourist trade. In normal pre-war years, e.g. 1930-31, some 1,500,000 foreign tourists travelled in Switzerland, as against only 800,000 Swiss, every year; six millions in Italy, about as many in France. Switzerland drew a surplus of £10 millions, Italy of £26 millions, Germany of perhaps £20 millions directly, and presumably much more indirectly from this "invisible export." Together with scenery and other amenities, the proper practice of gastronomy had a great share in this success; the realization of this fact, after the Second Great War, brought about efforts in Great Britain to overcome the lack of ingenuity, variety, and care in customary methods of food preparation.

It would be wrong to attribute this sociological phenomenon to the western world only. Persians, in their own way, upheld and

developed gastronomy as highly as the French; wealthy Chinese cultivate it to the point of a ritual, and Malays do not lag behind. But with the French it has long been integrated into spiritual life itself; dissertations on cooking and eating, by Lebault or Ruoff, and on wines, by Paul de Cassagnac and others, form a definite part of French literature.

Edgar Stern-Rubarth, Ph.D.

**Gastropoda** (Gr. *gastēr*, stomach; stem *pod*, foot). One of the great divisions of the sub-kingdom Mollusca. It includes those molluscs which have the ventral or under side of the body developed in a gliding base. Gastropods may be roughly defined as comprising snails and slugs, terrestrial, freshwater, and marine. The whelk is a familiar example of a marine gastropod. The underside of a gastropod is its organ of locomotion, and its mode of action may be seen by watching a land snail crawl on the window-pane, or a pond snail on the glass front of an aquarium. The body is slowly propelled forwards by a peculiar wave-like movement of the foot.

The body, which lies above the foot, consists of a well-defined head and a visceral hump, covered by an outer glandular layer known as the mantle. In slugs this hump is not very noticeable, but in snails it is long and coiled, and protected by a shell usually more or less conical in form. This visceral hump contains most of the internal organs. During development the internal organs of a gastropod undergo a kind of torsion or twisting, the result of which is to bring the posterior termination of the alimentary canal towards the head and the left-hand organs to the right. The nerve loop which involves the visceral organs thus becomes twisted into a figure of eight. The original left-hand organs, now on the right side, become atrophied, the result being that the internal arrangements of a gastropod are not symmetrical, and there is only one kidney, one gill, and one auricle to the heart.

Another interesting feature is the odontophore or lingual ribbon, situated at the back of the mouth. This is a long, horny band, called the radula, studded with a vast number of minute teeth. When a gastropod is feeding the substance is seized by the jaw, and the radula moves backwards and forwards, and scrapes off minute particles which pass into the stomach.

Gastropods are divided into two sub-divisions: the Streptoneura,

in which the twisting is well marked, and the Euthyneura, in which the visceral hump appears to be partly untwisted. The first sub-division contains two orders: the Aspidobranchia, which have flattened shield-shaped gill filaments, and the Pectinibranchia, in which the gills are comb-shaped. The second sub-division is also subdivided into two orders: the Opisthobranchia, in which the gills are behind the heart, and the Pulmonata, in which the gills are absent and the mantle cavity serves as a kind of lung. Most land and fresh-water gastropods belong to this last order.

Economically, certain marine gastropods are of value as food for man, as the whelk and periwinkle; and several species of land snails are consumed on the Continent, and to a small extent in Great Britain. Some aquatic gastropods do useful work as scavengers, while many of the terrestrial ones do great mischief in gardens by eating the plants.

Fossilised remains are found throughout the stratified rocks. Air-breathing forms were first met

with in Devonian rocks, while fresh-water snails were first found in Purbeck rocks, of much later age. See Mollusca; Snail.

**Gastrostomy** (Gr. *gastēr*, stomach; *stoma*, mouth). Operation of making a permanent artificial opening into the stomach through which food can be administered. It is performed where there is a stricture or obstruction of the gullet, as, for instance, by malignant disease, which prevents food from being swallowed. Gastrostomy is the operation of opening the stomach. Gastrectomy is the operation of removing the stomach or part of it. See Stomach.

**Gastrula**. Stage in the development of a multi-cellular organism. The single egg-cell develops by segmentation into a hollow ball of cells; one side of the ball next becomes indented, much as an indiarubber ball may be dimpled, and a thimble-shaped organism results. This is called the gastrula, and is very important as establishing an inner and outer germinal layer. It is the first hint of an organism containing a body cavity. See Embryology.

## GAS TURBINE: A ROTARY PRIME MOVER

G. Geoffrey Smith, Author, *Gas Turbines and Jet Propulsion for Aircraft*

*This article explains how this type of power plant, although not new in conception, came to the forefront as a practical proposition. The most spectacular of its successes has been in aviation; this is discussed under Jet Propulsion*

A gas turbine may be defined as a heat engine in which the potential energy of a fuel is released by combustion and applied to the working medium, air or gas, to produce kinetic energy which is converted to useful power at the shaft by a purely rotary mechanism. Its object is to obtain advantages of internal combustion allied to continuous power generation in a high speed rotating machine instead of intermittent power production in a reciprocating engine.

As in internal combustion piston engines, the main division of types is between those operating on the constant-volume and the constant-pressure cycles. Earliest efforts were directed to the building of units in which fuel was burnt intermittently under constant volume conditions in a closed chamber having timed admission and outlet valves. A plurality of chambers gave approach to continuity of gas flow at the turbine nozzle ring. Later turbines in commercial production and operation were almost exclusively of

constant-pressure type with continuous combustion of fuel in open combustion chambers.

A variant form was the compounded plant in which a highly supercharged, two-stroke, Diesel engine was used as a dynamic combustion chamber for the combustion of fuel in air at higher pressure than was possible in the normal static chamber. All power delivered at the engine shaft was absorbed in driving the supercharging blower and all useful power was obtained from a turbine operated by the exhaust gas. These turbines were all open-cycle plants in which air was compressed, heated, expanded through a turbine, and exhausted to atmosphere. The closed-cycle plant continuously circulated a fixed quantity of the working medium, air or gas, round a closed system comprising compressor, heat exchanger, turbine, cooler. The combustion of fuel was effected externally and applied through the medium of the heat exchanger.

Early development was retarded by low component efficiencies, and

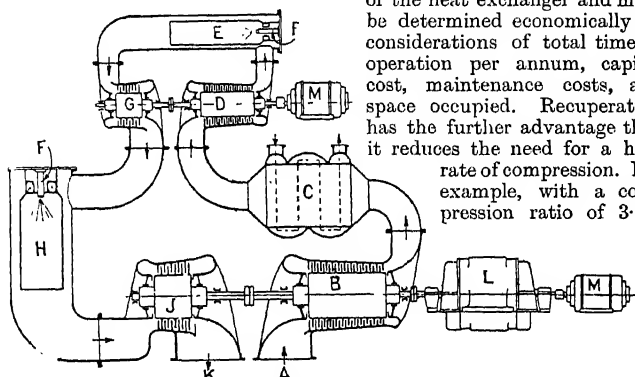
particularly by the low operating temperature of the medium enforced by the relatively poor materials available. For the turbine rotor and blading, steels were required that would withstand temperatures ranging from 600° to 800° C. without scaling, creep, loss of shape or undue reduction of strength whilst under the severe centrifugal loading imposed by high rotational speeds. It is estimated that an increase in gas temperature at the turbine inlet of 100° C. improves thermal efficiency by approximately 25 p.c.

Before the First Great War gas turbines of both constant-volume and constant-pressure types were built experimentally on the Continent by Stolze, Holzwarth, Lemale and Armangaud, and others, but only low thermal efficiencies were achieved and consequently specific rates of fuel consumption were inordinately high as compared with those of the then rapidly developing Diesel engine. The rotary compressor was undergoing intensive development and, somewhat later, the exhaust gas turbine began to receive new attention as a means of driving supercharging blowers to boost the output of aircraft engines. By 1919 a 1,000 h.p. constant-volume Holzwarth turbine built by the German firm Thyssen and operated on coke-oven gas realized a thermal efficiency of 26 p.c. at full load. A Holzwarth gas turbine and generator set developing 3,300 kW (4,420 h.p.) was also produced for the Prussian railway board.

The Swiss firm, Brown Boveri, from 1923 onwards built large

rotary compressor sets driven by turbines running on the hot exhaust gases constituted by the products of chemical and metallurgical processes. Examples are blast installations for steel-works and regenerating air supply for petroleum catalytic cracking plants. From the experience gained

650° C. before the turbine, has a thermal efficiency of about 20 p.c. Thermal efficiency can be substantially improved by a system of "recuperation," in which the exhaust from the turbine is used to heat the air before it enters the combustion chamber. The gain depends on the surface area of the heat exchanger and must be determined economically by considerations of total time of operation per annum, capital cost, maintenance costs, and space occupied. Recuperation has the further advantage that it reduces the need for a high rate of compression. For example, with a compression ratio of 3.5:1



Gas Turbine. Fig. 1. Diagrammatic lay-out of 2-stage gas turbine electric generating plant, without heat exchangers. A, air intake; B, low pressure compressor; C, cooler; D, high pressure compressor; E, high pressure combustion chamber; F, fuel sprayer; G, high pressure turbine; H, low pressure combustion chamber; J, low pressure turbine; K, exhaust; L, electric generator; M, starting motor

with these sets and by the development of a satisfactory combustion chamber to supply the gas, the pure gas turbine with constant pressure combustion was evolved.

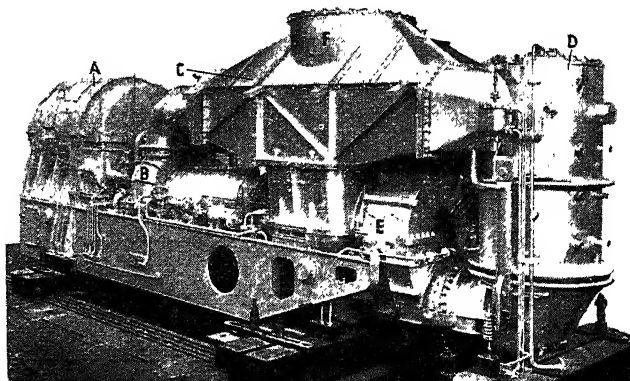
Essential components of the simplest plant are an air compressor, combustion chamber, and turbine. A 1,000 kW set of this type, compressing air to approximately 5 atm., using 10 p.c. of the air for the combustion of an oil fuel and 90 p.c. to lower the combustion gas temperature to about

and exchanger area of 0.5 m.<sup>2</sup> per kW, efficiency will be 24 p.c. while with a compression ratio of 2.5:1 and exchanger area of 2 m.<sup>2</sup> per kW, efficiency will be 29 p.c.

For generating electricity, gas turbines cost less to instal and to maintain than steam turbines or Diesel engines. Thermal efficiency is lower than that of a Diesel engine, but a cheaper fuel oil can be used; and the use of lubricating oil is almost eliminated. Running costs of a gas turbine having an efficiency of only 22 p.c. would not exceed those of a Diesel engine with an efficiency of 38 p.c.

Plants of more elaborate character, involving two or more compression stages, are built for higher outputs. In these, air flow is through the low pressure compressor, intercooler, high pressure compressor, heat exchanger, high pressure combustion chamber, H.P. turbine (driving H.P. compressor and the electric generator), L.P. combustion chamber, L.P. turbine (driving L.P. compressor), and is exhausted through the heat exchanger. One installation of this type in Switzerland is a 40,000 kW plant in two sets of 13,000 kW and 27,000 kW.

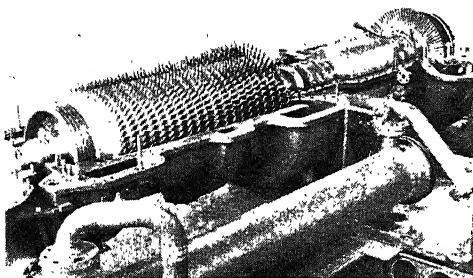
The application of the gas turbine is not limited to stationary power plants. In 1941 the Swiss federal rlys. put into service the first gas turbine locomotive in the



Gas Turbine. Fig. 2. Complete power unit with the generator and its reduction gear. A, The compressor, B, delivers air through the heat exchanger, C, to the vertical combustion chamber, D, where the fuel is burnt. From the base of the chamber the combustion gases, diluted by the excess air, are led to the turbine, E, and then exhausted vertically, F, through the exchanger, and discharged to atmosphere through the roof of the locomotive

world. Of the single-stage type with a relatively small heat exchanger, the turbine developed 10,000 h.p.; 7,800 h.p. was absorbed in driving the air compressor and 2,200 h.p. remained as useful work used to drive the electric generator through a reduction gearing. Final drive was by traction motors at the axles. Fig. 2 shows the complete power unit. Both Great Britain and the U.S.A. later developed gas turbine locomotives.

In 1950 the first motor-car powered by a gas turbine was demonstrated by the British Rover Co. It attained a speed of 85 m.p.h. In 1952 an improved model, with a heat exchanger, reached 141.756 m.p.h. over a flying kilometre; the gas turbine unit developed the equivalent of 200 b.h.p., the fuel being paraffin. In 1951 two R.N. motor torpedo boats were fitted with Metropolitan-Vickers gas turbines having a thrust equal to 2,500 s.h.p. The first merchant vessel to use a gas turbine power unit, a Shell tanker, completed a trip of over 13,000 miles in Jan., 1952. The gas turbine, made by the British-Thomson-Houston Co., was linked to an electric alternator. The turbine developed a thrust equivalent to 1,200 b.h.p. The Rolls-Royce Dart gas turbine engine was fitted to Vickers Viscount passenger air-



Gas Turbine. Fig. 3. Axial flow 20-stage air compressor, and 5-stage gas turbine for 3,500 h.p. marine propulsion plant, shown with upper casings removed

craft in 1951, and to Bristol Britannias in 1952.

In military aircraft, the gas turbine, allied with jet propulsion, displaced the piston engine. For civil aircraft flying at medium altitude and medium speed, the gas turbine driving a propeller had many advantages over the piston engine.

In the highly specialised form of gas turbine developed for aircraft, component efficiencies were raised until air compressors of the axial type and single or multi-stage turbines had efficiencies of 88 p.c. and 90 p.c. respectively.

**Gas Warfare.** See Chemical Warfare.

**Gata, SIERRA DE.** Mt. range of Spain. Lying between the provs. of Cáceres and Salamanca, it is an extension of the Guadarramas on the E. (Their western continuation in Portugal is called the Serra da Estrella.) The maximum elevation is 5,695 ft. The slopes of the range are covered with oaks, pines, and chestnuts; and in the valleys, which are watered by many small

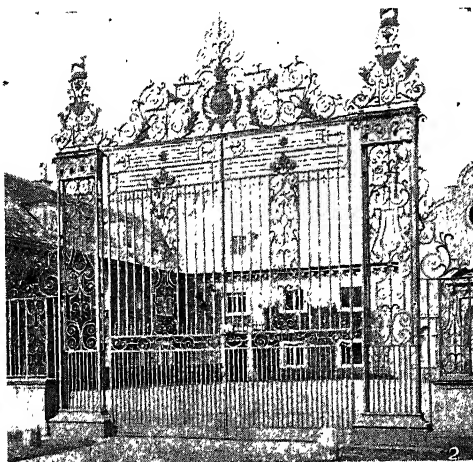
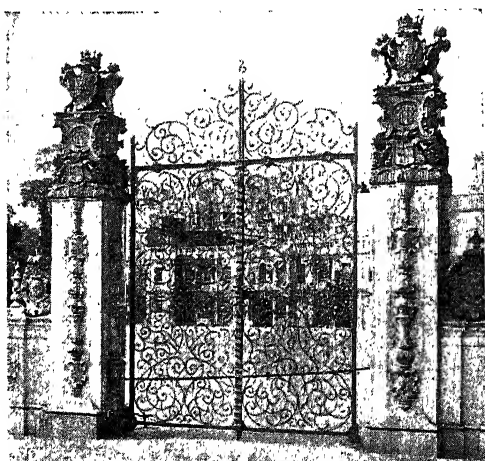
streams, olives, fruit, and vegetables are grown. The small town of Gata, in Cáceres prov., lies on the southern slopes, 65 m. N.W. of Cáceres. Pop. (1950) 2,585.

**Gatchina.** See Gatshina.

**Gate** (A.S. *gaet*, *gap*). Movable barrier, usually hinged, in an enclosing wall or fence to permit ingress and egress. Gates are usually of wood or metal, or a combination of these. Their value was recognized as soon as man began to raise fortified walls round his towns or encampments; they were part of the defensive system of every age. City gates were used by the Romans, and during the empire they became much more ornamental, though they did not lose their military character. The monumental gateways of Rome had two passages, one for entrance and another for egress, and occasionally side passages for pedestrians only. These were flanked by towers, square or circular, and their summits were machicolated.

In the Middle Ages this treatment of gateways was maintained, and extended to feudal castles; bridges were fortified at both ends by powerful gateways; there was frequently a third gate in the middle of the bridge, where toll was exacted. Architecturally, they conformed to the prevailing Gothic style. The 14th-century gate at Dinan and the contemporary Porte Guillaume at Chartres may be cited. Much beautiful ironwork went into the gates of the 18th century, the military use of the gateway having by then disappeared.

On the other hand, in England the enclosure of fields within



Gate. 1. Gateway at south entrance of Castle Ashby, Northamptonshire, built in 1865. 2. West forecourt gate of Belton House, near Grantham, an example of 17th-century work

hedgerows, fences, and walls led to the ubiquitous use of wooden field gates wide enough to admit a cart. These were intended not so much to keep out intruders as to keep cattle from straying. The commonest form is the wooden breast-high single swing gate, known as the five-barred gate, though methods of hanging, types of catch, and other details are infinitely varied throughout the U.K., even from estate to estate. Another form of English field-gate used as an alternative to the stile, and for the same purpose, is the "kissing" gate, which is a wicket-gate (i.e. one permitting the passage of one person only) with three gateposts, the free side of the gate so swinging between two of them as to bar the way effectually whichever one it rests against, thus making any catch unnecessary.

**Gate.** Term used in two senses in metallurgy. (1) The opening in a pair of rolls, used for producing metal sheet or strip in a rolling mill.

(2) The hole in a mould through which the molten metal flows into the mould itself, giving the casting its shape. If the mould is made out of sand, once the pattern has been removed a large down-runner is made and from this a small ingate leads off into the mould proper. The runner becomes filled with liquid metal and so provides a steady supply to the casting as it shrinks. Sometimes for a larger casting, where the shrinkage is correspondingly greater, a feeder cone is also provided to supply extra metal. *See* Foundry.

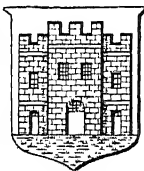
**Gate.** Term popularly applied to the total amount of money paid by spectators for admittance to a sporting fixture. In certain events, notably professional boxing, the contestants are entitled to a proportion of the gate.

**Gatehouse.** Structure above and on each side of a gateway. It was used to guard the solid bridge or drawbridge that gave access to the medieval castle or fortified manor house. The Gatehouse of Westminster was built in 1370 by Walter de Warfield within the precincts of the abbey on a site now occupied by the Crimean Memorial. It was used as a prison by Whitgift in connexion with the eccles. courts, and by the Star Chamber. Here Sir Walter Raleigh spent the night before his execution, and Sir John Eliot, the poets Lovelace and Savage, and other eminent men were incarcerated. After serving as a debtors' prison the

Gatehouse was demolished in 1776, but one of its walls remained until 1836. *See* Westminster.

**Gateshead.** County borough and seaport of Durham, England. It stands on the S. bank of the Tyne opposite Newcastle and joined to it by five bridges, and is on a main railway line. Fine buildings are the cruciform church of S. Mary, a 15th century edifice, rebuilt in the 18th; the town hall, 1868; the public library, in the English Renaissance style; the Shipley Gallery, a classical building containing a fine collection of pictures, the gift of Joseph A. D. Shipley; grammar schools standing in spacious grounds, and a technical college. The town has a mechanics' institute, children's hospital, nurses' home, a mental hospital, and a hospital for infectious diseases, while the corporation maintains swimming baths, cemeteries, an art gallery and recreation grounds. Among the last are Saltwell Park (52 acres), with a fine sheet of water; Windmill recreation grounds (11½ acres); Tyne Vale Park (1½ acres); and the Sunderland recreation ground (2 acres).

The industries include shipbuilding, iron and engineering works, and the making of glass and chemicals. There are large railway shops in the town. There is some shipping, coal being exported: In the vicinity, on the river Team, are Ravensworth, opposite Gateshead Fell; Stella Hall, an Elizabethan mansion; and the ruins of Prudhoe Castle.



Gateshead arms

Gateshead is an ancient town and in Roman times was called Gabrocentum. At the Conquest it was a place of importance. Bishop Walcher, a native of Lorraine, made a bishop by the Conqueror, was murdered here in the 11th century. The town's first charter dates from 1164, and it was incorporated in 1661. It was then, as it had been since Norman times, under the authority of the bishop of Durham. It became a parl. bor. under the Reform Act 1832, a mun. bor. 1835, a co. bor. 1889. The bor. forms two bor. constituencies. Pop. (1951) 115,039.

**Gate Theatre.** London theatre club in Villiers St., Charing Cross. In 1934 Norman Marshall became director, and in five years produced plays which became famous in London and New York, e.g. *Victoria Regina*; *Parnell*; *Oscar Wilde*; *Mr. Gladstone*; *Of Mice and Men*. *Revue*s presented here in the late 1930s gained a reputation for wit and liveliness. On the outbreak of the Second Great War the theatre was closed; it was destroyed by German bombs in 1940-41.

**Gath** (Heb., wine-press). One of the chief cities of the Philistines, the site of which is uncertain. It stood on the borders of Judah and was famed as the birthplace of Goliath. At one time it was under the rule of the Egyptian kings, and at another had kings of its own, for it was with Achish, king of Gath, that David took refuge. It was conquered by Sargon, king of Assyria. Still existing in the Middle Ages, it was fortified by the Crusaders, captured by Saladin in 1191, and retaken the next year.

**Gathurst Powder.** Permitted explosive of the non-nitroglycer-

ine type, based on ammonium nitrate (49-52 p.c.) with T.N.T. (13-15 p.c.) as sensitising agent. It is used for coal getting, especially when large-sized material is required.

**Gatineau.** River of Quebec, Canada. It rises in some lakes in the S. part of the prov., and flows almost due S. until it joins the Ottawa river about one mile below the city of Ottawa. Its length is 240 m.



Gatehouse, Westminster, before its demolition in 1776

From an old print

**Gatling, RICHARD JORDAN** (1818-1903). U.S. inventor. Born in N. Carolina, Sept. 12, 1818, he qualified as a doctor, but never practised. He invented the machine-gun named after him, a hemp-breaking machine, and a steam plough. He died Feb. 26, 1903.

The Gatling gun, invented in 1862, was of the type known as non-automatic. It had six barrels mounted round a central axis, the barrels and operating mechanism revolving round the axis when a crank was turned. The cartridges were placed in a feeding box on the top, and fell by gravity into the gun as each shot was fired. The barrels were cooled by a water jacket extending about half their length. This gun, adopted by the British army and navy in 1871, was superseded by the automatic machine-gun soon after the South African War. See Machine-Gun.

**Gatshina.** Russian town, in the Leningrad region of R.S.F.S.R. It is 25 m. S.W. of Leningrad on a lake formed by the river Izhora. Gatshina was originally an estate given by Peter I to a sister; later it was the property of Prince Orloff. Catherine II bought out his heirs and gave the property in 1785 to the future tsar Paul I. From that time dates the fame of Gatshina as the residence of the tsar's heir. In 1797 it became a town. It was the favourite residence of Alexander III.

Going to Gatshina from Petrograd on Oct. 25, 1917 (O.S.), Kerensky used it as a base in an attack against Soviet forces until Nov. 1, when Gatshina was taken by Soviet troops and Kerensky fled. Yudenich captured the town Oct. 19, 1919, and a fierce battle went on in the neighbourhood till Nov. 5, when Soviet troops retook it. Its name was changed to Trotsk, then to Krasnogvardeysk, and back to Gatshina.

**Gatun.** Town of Panama, in the Panama Canal zone, belonging to the U.S.A. It stands at the confluence of the rivers Gatún and Chagres, 7 m. by rly. S. of Colon on the Atlantic coast. Here are locks and a dam, part of the canal works. The dam is over  $1\frac{1}{2}$  m. long by 2,100 ft. wide at the base; the crest is 115 ft. above sea level and 21 ft. above the normal level of Lake Gatún, and 100 ft. wide.

**Gatun, LAKE.** Artificial body of water in the Panama Canal zone created by the damming of the Chagres river. It forms a section of the Panama Canal, being from 500 to 1,000 ft. in width and

standing 85 ft. above sea level. The ascent to it is made by three locks from the Atlantic side and three from the Pacific side, the flights being duplicated so that ships can pass upwards and downwards simultaneously. A spillway actuates a hydro-electric station giving power to operate the lock gates, which have an aggregate weight of 25,000 tons.

**Gatwick.** Airport of Surrey, England. It lies 27 m. S. of London and 6 m. S. of Reigate, and is served by British Rlys. Occupied by the R.A.F. during the Second Great War, it was used later by charter air operators until in 1956 development began to make it an alternative to London airport. The famous Gatwick racecourse was swallowed up in the extended airport which was expected to come into use in 1958.

**Gau.** Old Teutonic word meaning district. In the old Germanic state it comprised several villages, united for judicial and military purposes, under the control of a count (*Gaugraf*), and corresponded to the English shire or county. It lost its political meaning in the 12th century, but the name survives in Aargau, Torgau, Oberambergau, etc., and was revived by Hitler, who used the name *Gauleiter* for Nazi leaders in charge of a district. *Pron.* gow.

**Guauchos** (Araucanian, friends). People of mixed S. American Indian and Spanish blood in Uruguay and the Argentine pampas. One strain claims descent from the Spanish conquistadores modified in their native environment. Another is much mixed with Guaycuru blood in Uruguay, with Araucanian on the pampas. Daring horsemen, wielding bola and lasso, they were nomad cattlemen, distinguishable from the Indians of the pampas. *Pron.* gowchoso.

**Gaudeamus.** Title and first word of an old German students' song in dog-Latin. The theme of it is "let us rejoice, then, while we are young" (*Gaudeamus igitur juvenes dum sumus*). This song gives the title Gaudeamus to a collection of students' and school songs by John Farmer, 1890.

**Gauden, JOHN** (1605-62). English author and bishop. Educated at S. John's College, Cambridge, he became dean of Bocking in 1641, having parliamentary sympathies, which later events modified. He published several defences of the Church during the Commonwealth, and was made bishop of Exeter in 1660, being translated to Worcester in 1662, but dying May 23. He is

remembered as claimant to the authorship of *Eikon Basilike* (q.v.), a controversial point still undecided.

**Gaudier - Brzeska, HENRI** (1891-1915). French sculptor. He was born at St. Jean de Braye, Loire, Oct. 4, 1891, the son of a joiner, and studied in Germany. The name Brzeska which he added to his own was that of a Polish governess, the two living in London as brother and sister. His chief works represent the culmination of the Vorticist school of sculpture; three are in the Victoria and Albert museum, S. Kensington. He was an initial member of the London Group, and his genius was already evident when at 23 he was killed in the First Great War, June 5, 1915. He was the subject of a memoir by Ezra Pound, a biography by H. Brodsky, another by H. S. Ede (*Savage Messiah*) and a play by Gordon Daviot. *The Laughing Woman*, 1934.

**Gaudy.** Term used for a festival of rejoicing or commemoration in an Oxford college. It appears to be derived from Lat. *gaudeamus*, let us rejoice. Gaudy Night was the name of a detective story by Dorothy Sayers, 1935.

**Gaugamela, BATTLE OF.** Alternative name for the battle of Arbela (q.v.).

**Gauge** or **GAGE.** Term used for various types of measuring instruments, e.g. water gauge, pressure gauge, wire gauge, and also as a standard, e.g. railway gauge.

There is a great variety of gauges, many of which are fully described under their various headings. Among them are wire gauges, used for the measurement of the external diameters of wires, certain of which, e.g. the Birmingham wire gauge, have become standard in Great Britain; a marking gauge, a tool used by carpenters for scribing a line parallel to the edge of a piece of wood, etc.; rain gauges, used for measuring the rainfall; and water and steam pressure gauges attached to steam boilers, enabling the engineer to ascertain the quantity of water in the boiler and the head of steam. Railway gauge is the width between the lines of a railroad. In Great Britain and most countries of Europe, Canada, and the U.S.A., the standard gauge is 4 ft. 8½ ins. A gauge greater than this is called a broad gauge, one smaller a narrow gauge.

The term gauge is also used in a nautical sense for the relative positions of two vessels and the wind.



A vessel is said to have the weather gauge of another vessel when on the windward side of it, and the lee gauge when on the lee side. In Scotland the term gauger is used for an exciseman, i.e. one who gauges or measures the contents of casks.

A feature in modern engineering practice is the use of gauges and gauging systems. Micrometer gauges, measuring sizes to the nearest  $\frac{1}{1000}$  inch or less, have been in use for many years, but the necessity for interchangeability of the large number of similar machine parts involved in mass production has led to universal use of "limit" gauges. A gauge for a cylindrical part is set to two sizes, one marked "Go" and the other marked "Not Go," so that the machinist is relieved of the labour of setting a micrometer to the size and has only to ensure that the "Go" section passes over the diameter and the "Not Go" section does not. A cylindrical gauge, similarly marked, would be used for the hole; it must be so arranged that the shaft with the largest dimensions will pass through the hole with the smallest dimension. The maximum permissible difference of diameter between the smallest shaft and the largest hole is known as tolerance. See Pressure Gauge; Railways; Steam Gauge; Water Gauge.

**Gauguin**, (EUGÈNE HENRI) PAUL (1848-1903). French painter. Son of a French father and a Spanish mother, he was born in Paris, June 7, 1848. He served in the French navy, and after the Franco-Prussian War worked in a

bank. Becoming interested in Impressionism, though virtually self-trained he gave up his commercial career in 1883, separated from his wife and children, and devoted himself to painting. In 1887 he visited Martinique, and on returning lived with van Gogh (*q.v.*) at Arles. After an interlude in Brittany, he left in 1891 for Tahiti, to live in complete freedom from convention and adopt native customs. He returned to Paris in 1893 to sell his pictures, but sailed again two years later for his artistic Utopia. He died May 9, 1903, in the Marquesas, where he had spent three years, and was buried there.

Gauguin's art is characterised by the use of brilliant colour and simplified form. His early pictures, like *The Yellow Christ*, and *Jacob's Struggle with the Angel*, are decorative and recall in their feeling of repose the Italian primitives. Later ones were often painted from memory and given Tahitian titles. One of the most famous, *Nevermore*, is in the Tate Gallery, London; many are in the chief galleries of Europe and the U.S.A.

Gauguin wrote an autobiographical novel, *Noa Noa*, published 1924. His *Letters to de Monfried* were edited in 1918, and his *Intimate Journals* in 1936. Among many Lives, those of J. G. Fletcher, 1921; J. de Rotonchamp, 1925; B. Becker, 1931; R. Burnett, 1936, may be mentioned. Gauguin with his turbulent character was the model for the hero of Somerset Maugham's novel, *The Moon and*

*Sixpence*, 1919, of which a film was made 1942, an opera by John Gardner in 1957.

**Gauhati** or GOWHATTY. Town of Assam, India, capital of the Kamrup district. Standing on the left bank of the Brahmaputra, 70 m. E. of Goalpara, it is an important centre of the river trade. A ferry to Pandu joins two sections of railway. The temple of Kamakhya, on an eminence in the neighbourhood, and the rocky islet of Umananda in the Brahmaputra, are places of Hindu pilgrimage. There are many ruined temples on both sides of the river. Gauhati was the headquarters of the British administration in Assam, until in 1874 it was moved to Shillong. Pop. (1951) 43,615.

**Gaul**. Old name for France. It is derived from Gallia, the name given to that country by its Roman conquerors. This Gaul, larger than modern France, included modern Belgium and parts of Germany, the Netherlands, and Switzerland. Gaul was conquered by Julius Caesar and organized under Augustus and Tiberius. Most of its inhabitants were Celts.

Northern Italy was called by the Romans Gallia Cisalpina (Gaul on this, i.e. the Roman, side of the Alps), and Gaul was sometimes referred to as Gallia Transalpina (the other side of the Alps).

The Gaulish language, as the Continental Celtic spoken at the beginning of the Christian era by the Celtic peoples on the Continent of Europe (in the two Gauls, the Iberian Peninsula, part of Central Europe, and Galatia in Asia Minor) is usually called, is known only from about 50 inscriptions, a number of personal, tribal, and place names, and a few loanwords in other languages. The extant materials are far from being sufficient for the establishing of a grammar of the language, but are of value for the elucidation of place and other names, and for the philology of the early forms of Irish and Welsh.

**Gaulle**, CHARLES ANDRÉ JOSEPH MARIE DE (b. 1890). French soldier and statesman. Son of a professor, he was born at Lille, France, Nov. 22, 1890, and educated at the Collège Stanislas, Paris, and the École Militaire de St. Cyr. During the First Great War he fought in the 33rd infantry regiment (then commanded by Col. Pétain) in Belgium and Champagne, being promoted capt. 1915. Wounded three times, he was captured by the Germans at Verdun in 1916,



Gauguin. Study of native women, Te Rerioa, by Paul Gauguin, painted after 1891, when he exchanged European civilization for a primitive life in Tahiti

remaining a prisoner until Nov., 1918, although he made five attempts to escape from captivity.

He served in Poland with Gen. Weygand, 1920-21; became prof. of military history at St. Cyr, and passed through the École Supérieure de Guerre. On Marshal Pétain's staff until 1927, de Gaulle was in the Middle East 1929-32, and, promoted col. in 1937, assumed command of the 507th armoured regiment at Metz. In 1934 he published *Vers l'Armée de Métier* (Eng. trans. *The Army of the Future*, 1940), in which he advocated the formation of armoured divs. with lorried infantry; it aroused no interest in France, but a great deal in German military circles.

In 1939 de Gaulle was in command of the armour of the 5th army; in May and June, 1940, as général de brigade commanding the 4th motorised div., he launched successful counter-attacks against the Germans at Laon and at Abbeville. On June 6 Reynaud made him under-secretary for national defence. But Reynaud resigned on the 17th, and Pétain, who succeeded him, asked the Germans for an armistice. De Gaulle escaped to London whence he broadcast on the 18th a call to rally the French and on the 22nd, after the signing of the armistice, to announce the formation, in agreement with the British government, of a French national committee to maintain the independence of France and assume the direction of French affairs outside the occupied soil of France, ending, "The war is not lost, the country is not dead, hope is not extinct. *Vive la France!*" Five days later he announced that a French volunteer legion (the nucleus of the Free French—later Fighting French—forces) would be formed in the U.K. Despite a Vichy decree of July 29 making all French subjects enrolling in a foreign army or enlisting for service with a foreign power liable to the death penalty, and the sentence of de Gaulle himself to death *in absentia* on charges of treason and desertion, supporters escaped in a steady stream to Great Britain. The support he



Charles de Gaulle, French soldier and statesman

received from the colonial empire, however, was less than he had hoped—only French Equatorial Africa and the New Hebrides and New Caledonia declared for him; Catroux, governor of Indo-China, and Legentilhomme, governor of French Somaliland, joined him, but could not bring over their territories; and the failure of his expedition to Dakar (*q.v.*), where, he had been led to believe, he would be welcomed, was a serious setback.

In Oct., 1940, he set up a council of defence of the empire, and in Sept., 1941, a representative national committee which was in effect a provisional French government. He was in constant touch with the underground resistance movement inside France, which, after negotiations, accepted him as its leader. American recognition in Nov., 1942, of Darlan (*q.v.*) as high commissioner of French North Africa produced a difficult situation; but after Darlan's assassination de Gaulle entered into negotiations with his successor, Giraud, and in June, 1943, became joint president with him of the committee of national liberation (replacing the national committee) formed at Algiers and exercising sovereignty over all French territories outside the enemy's power. Giraud, however, was weak, and without prestige inside France, where he was regarded as an American puppet. In Nov. he resigned, and de Gaulle remained sole president.

De Gaulle returned to Great Britain on June 4, 1944, and on the day of the Normandy landings, June 6, broadcast an appeal to the sons of France to fight with all the means at their disposal at the side of the Allies. Landing in Normandy on the 14th, he received a tremendous welcome at Bayeux and elsewhere. With the committee of national liberation, which had on June 2 assumed the title of provisional government of the French Republic, he entered Paris immediately it was liberated. He at once formed a new government, composed of some of those who had been his colleagues at Algiers, and of members of the resistance movement who had remained in

France, among these being Georges Bidault, leader of the national council of resistance, who became foreign minister. De Gaulle's first act was to abolish the so-called French state set up by Pétain; but he did not restore the constitution of 1875. In Oct. his government was recognized as the provisional government of France by the U.K., the U.S.A., and the U.S.S.R.; and in Dec., with his foreign minister Bidault, he negotiated in Moscow a 20 years' treaty of alliance and mutual assistance with the U.S.S.R. To his steadfast insistence on the status of France through the years of defeat and afterwards, France owed the fact that, though not represented at the Potsdam Conference (*q.v.*), she was recognized there as one of the major allies and allocated a zone of occupation in Germany.

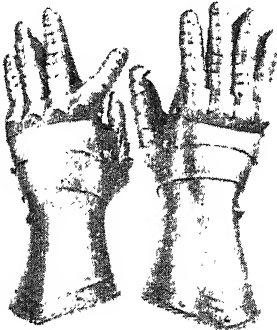
In Nov., 1945, chosen head of the govt. by the newly elected constituent assembly, de Gaulle with difficulty formed a new coalition government. There was disagreement between him and the Left parties in the assembly on many matters, and in Jan., 1946, he resigned without warning. In April, 1947, he proclaimed the formation of the *Rassemblement du Peuple Français* (rally of the French people) with himself as its head, and as its aim the promotion of national unity. In Oct. R.P.F. candidates in the municipal elections received 38.6 p.c. of the votes cast; in Nov., 1948, they were the largest group (79) elected to the upper house; in June, 1951, the largest group (118) elected to the assembly. But internal differences weakened the rally, and it soon sank into insignificance. De Gaulle published war memoirs, 1955-56.

**Gault.** Soft, bluish clay of Cretaceous age. It occurs between Lower and Upper Greensand in the south of England. It is used in the manufacture of bricks and tiles.

**Gaultheria.** Volatile oil used in medicine for the treatment of muscular rheumatism. *See* Wintergreen.

**Gaunt.** English variant of Ghent. Name borne by John of Gaunt, duke of Lancaster, who was born at Ghent. *See* Lancaster, Duke of.

**Gauntlet** (Fr. *gantelet*, little glove). In armour, a glove of leather covered with scale-work or overlapping metal plates which permitted the hand to close. It was originally made without separate fingers, and with a metal extension over the wrist. Throwing down a gauntlet was a recognized form of challenge which survives as part of



Gauntlet. Specimens of Italian work, early 16th century  
Wallace Collection, London

the British coronation ceremonial. Running the gauntlet was a former mode of punishment in which the offender ran between two rows of men armed with sticks or ropes, receiving a blow from each. Gauntlet here is a corruption of the Swed. *gallopp*, lane-run, first anglicised as *gantlope*. See *Armour*; *Challenge*; *King's Champion*.

**Gaur** or **GOUR** (*Bibos gaurus*). Species of large, wild cattle. Found in great herds in forests of India and Burma, they are black in colour, with prominent ears and flattened horns; and often as much as 6 ft. high at the withers.

**Gauss**. The centimetre-gramme-second (C.G.S.) unit of magnetic flux density. It was formerly used as the unit of intensity of a magnetising field, but this is now known as the oersted. See *Degaussing*; *H. C. Oersted*.

**Gauss, KARL FRIEDRICH** (1777–1855). German mathematician and physicist. Born in Brunswick, April 30, 1777, the son of a bricklayer, he was educated by the reigning duke of Brunswick, and became an outstanding mathematician, writing a standard work on the theory of numbers. He studied electricity and magnetism, and formulated the law of magnetic flux density, which states that the number of lines of magnetic induction crossing a closed surface surrounding a magnetic pole of strength  $M$  is equal to  $4\pi M$ . In his honour the unit of magnetic field was called the Gauss (*v.s.*). His calculation of the elements of the planet Ceres placed him in the highest rank of theoretical astronomers. He became director of the Göttingen observatory, 1807, and died there, Feb. 23, 1855. The method of protecting ships against magnetic mines used in the Second Great War and called degaussing (*q.v.*) takes its name from GAUSS.

**Gaussberg**. Mountain mass of Kaiser Wilhelm II Land, Antarctica. It has an alt. of 1,148 ft., and was discovered by the explorer Drygalski in 1902 and surveyed by the Mawson Expedition, Nov. 22, 1912. It lies between lat 67° S. and the Antarctic circle, long. 89° E.

**Gausson, FRANÇOIS SAMUEL ROBERT LOUIS** (1790–1863). Swiss Protestant theologian. He became pastor of the Swiss Reformed church at Satigny, but was deposed in 1832. In that year he helped to found the evangelical society, and was professor of theology at Geneva, 1836–1857. He died June 18, 1863. His works included *Theopneustics* and *Canon of Scripture*.

**Gautama** (*c.* 560–480 B.C.). Name of Buddha, founder of Buddhism (*q.v.*).

**Gautier, THÉOPHILE** (1811–72). French author. Born at Tarbes, Aug. 31, 1811, and admitted young

to Hugo's circle, he was an enthusiastic supporter of the master in the "battle of Hernani," and later gained further notoriety with two brilliant but licentious romances, *Albertus*, 1830, in verse, and *Mlle. de Maupin*, 1835, in prose. Though compelled to give much of his energy to journalism, his work in literature was voluminous and varied. In verse his principal volumes are *La Comédie de la Mort*, 1838, and *Émaux et Camées*, 1852. His prose includes many tales and



Théophile Gautier



Gavarni. Lithograph by the French caricaturist from his series entitled *Le Carnaval*

stories (*e.g.* *Fortunio*, 1838, and *Jettatura*, 1857); a remarkable piece of archaeological fiction, *Le Roman de la Momie*, 1856; *Le Capitaine Fracasse*, 1863, a dashing historical novel of adventure; some picturesque records of travel; the charming semi-autobiographical *Paradis des Chats* (published in *Le Figaro*) and *Ménagerie Intime*, 1869; and numerous volumes on the history of literature and art (*Les Grotesques*, 1844; *L'histoire de l'Art Théâtral en France depuis 25 Ans*, 1860; and the posthumous *L'histoire du Romantisme*).

Gautier early outgrew his extreme romanticism, the extravagances of which he satirised in *Les Jeunes-France*, 1833; and in his poetry, in opposition to the prevailing mode, he sought to paint pictures rather than to analyse and express his personal emotions. Unlike most of the romantics, too, he was utterly indifferent to all philosophical and social interests. He died Oct. 23, 1872.

**Gauze**. A thin, transparent fabric of silk or cotton, and either plain or figured. In true gauze adjoining warp threads are crossed over each other by the action of a special harness in the loom. Spital-fields and, later, Paisley were long noted for their silk gauze manufactures. Plain and medicated varieties are used as surgical dressings. The word is possibly derived from *Gaza*, in Palestine, whence it was first introduced.

**Gavarni, PAUL**. Pseudonym of Guillaume Sulpice Chevalier (1801–66), French caricaturist.

Born in Paris, Jan. 13, 1801, he adopted his pseudonym from the village of Gavarnie, Hautes-Pyrénées, of which he showed a drawing at the Salon, 1829. Settling in Paris, he soon became well known for his elegant drawings of fashionable women in *La Mode*, 1830. Joining the staff of *Charivari*, however, he disclosed his remarkable talent for caricature.

In 1849 he visited England, producing Gavarni in London for *The Illustrated London News*, and his lithograph, *The Highland Piper*, his masterpiece in this style. He died at Auteuil, Nov. 24, 1866. He illustrated Eugène Sue's *The Wandering Jew*, Balzac's novels, and other books.



Paul Gavarni, French caricaturist



Gavarnie, France. Part of the Cirque, showing the cascade 1,515 ft. in height

**Gavarnie.** Village of France, in dept. of Hautes-Pyrénées. Lying 12 m. S. of Luz-St. Sauveur, it is famed for a vast *cirque*, a mountainous amphitheatre with a cascade 1,515 ft. in height.

**Gavelkind** (A.S. *gafol*, tribute; *cynd*, kind). English name for a form of land tenure found in Kent and sometimes elsewhere. Its main feature was that in cases of intestacy the land passed to all the sons equally. This form of tenure was long common outside England, and was customary in the country before the Norman Conquest. Land held in gavelkind could be disposed of by will, and was not forfeited by treason. The widow's dower was one-half, not one-third. One theory is that William the Conqueror granted this privilege to the people of Kent in return for their valour. Gavelkind was abolished in 1926. See Land Laws; Primogeniture.

**Gaveston**, PIERS (ex. 1312). Favourite and foster-brother of Edward II of England. Son of a Gascon knight, he gained complete ascendancy over the young prince, but his insolence having alienated the great barons he was banished by Edward I. On Edward II's accession in 1307 he was recalled and created earl of Cornwall, and in 1308 was appointed regent during his patron's absence in France. After acting as lieutenant of Ireland he was again compelled to leave the kingdom. In 1311 he returned to England, but in 1312 the barons having leagued against him, he surrendered at Scarborough, and was beheaded on Blacklow Hill, near Warwick, June 19. His body, having lain at Oxford, was, in 1315, reinterred at King's Langley.

**Gavial** or **Gharial**. Member of the crocodile family, distinguished

from the others by its very long and slender snout. It is common in India, where it sometimes attains a length of 20 ft., and lives in the larger rivers. It feeds upon fish, and is rarely known to attack land animals, which may possibly be the reason why certain Hindu sects regard it as sacred. Remains belonging to this family have been found in Tertiary deposits.

**Gävle.** The name of this Swedish seaport is otherwise spelt Gefle (*g.v.*). Gävleborg co. similarly appears as Gefleborg.

**Gavotte** (Fr.). Graceful old dance in duple time, beginning on the second half of the bar. Many examples are to be found in the suites (*g.v.*) of Bach and other 18th century composers. There are often two gavottes, the first one to be played again after the second. Sometimes the second gavotte is called a musette (*g.v.*). Gavotte was the dance of the Gavots—or people of the Pays de Gap. It was danced at the French Court in the 16th century and was more than once altered to suit new ideas.

**Gawaine**, SIR. One of the Knights of the Round Table in the Arthurian legend. He was the son of King Lot of Orkney, and nephew of King Arthur. He inadvertently slew a woman early in his knight-hood, and was thereafter bound to fight in quarrels involving a woman.

**Gawler.** Town of S. Australia. It is 23 m. N. of Adelaide, on the river Gawler, and the centre of a wheat and vine growing area, yielding also gold, silver, lead, and copper. It contains engineering works and foundries, flour mills, and breweries.

**Gawsworth.** Village of Cheshire, England. It lies 3 m. S.W. of Macclesfield and is charmingly set between small lakes. The church, partly Norman, mainly 15th century, was restored in 1851; it has gargoyles and odd carvings, and tombs and monu-

ments of the Fytton family, of whom Mary may have been the Dark Lady of Shakespeare's sonnets. The rectory dates back to 1470, and there are an Old Hall and a New Hall, the latter built by Lord Mohun. The village shows one of the best tilting grounds of medieval England.

**Gay**, JOHN (1685-1732). English poet and dramatist. Born at Barnstaple, he began life as a silk



John Gay, English poet

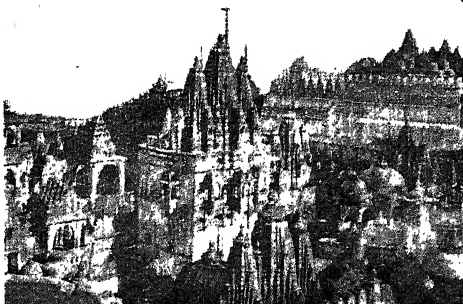
mercator, but forsook business for literature. His first real success was a pastoral, *Shepherd's Week*, 1714, written at the suggestion of Pope, to whom he had dedicated

a previous effort. This was followed by *Trivia*, 1716, a description of the moving panorama of the London streets, and by his *Fables*, 1727, which were a notable success. His best work, however, is *The Beggar's Opera* (*g.v.*), 1728, a lyrical drama of thieves and highwaymen. It had a great vogue, and Gay followed it up with a sequel, *Polly*, which, on account of its political references, was prohibited; but it was published in book form, 1729.

Among other pieces from Gay's pen was the well-known ballad, *Black-eyed Susan*. He supplied the libretto for Handel's *Acis and Galatea*, 1732. Gay was a great social favourite. His last years were spent in the household of his friends the duke and duchess of Queensberry, and he died on Dec. 4, 1732. Gay wrote with grace and distinction the artificial verse of the period, but he sometimes shows a true feeling for nature. A complete edition of his poetical works, by J. C. Faber, appeared in 1926. Consult also *Life and Let-*

*ters*, L. Melville, 1921; John Gay: His Place in the 18th Century. P. F. Gayer, 1938.

**Gaya.** City and district of India, in Bihar state, Patna div. Gaya district, area 4,766 sq. m. is notable for its many associations with the ancient Buddhist religion. Thus at Buddh Gaya is the great temple of that name, which



Gaya, India. General view of the Buddhist temples and shrines in the town

dates back to 543 B.C., and the Barabar Caves, 16 m. N. of Gaya, are regarded as among the oldest existing Buddhist monuments. Gaya city contains the famous temple of Vishnupada and other sacred shrines. Of the total area of the district about two-thirds is under cultivation, watered by right-bank tributaries of the Ganges; and of the cultivated area half is devoted to rice; other crops are wheat, pulses, and oilseeds. There are a number of small industries, among them the making of carpets and rugs, ornaments, stoneware, and lac. Pop. (1951) dist., 3,070,499; city, 133,700.

**Gayal** (*Bibos frontalis*). Species of wild ox found in the hilly regions of N.E. India. It is smaller than the gaur, with which it is said to interbreed, and has straighter horns without any crest between them. It is more often seen in a semi-domesticated state than wild.



Gayal. Domesticated ox kept by the peoples of north-east India  
W. S. Berridge, F.Z.S.

**Gayangos y Arce, PASCUAL DE** (1809-97). Spanish historian. Born at Seville, June 21, 1809, he became professor of Arabic at Madrid, 1843, and, in 1881, director of public instruction for Spain. His historical and literary work was mainly that of editing MSS., letters, etc., and his skill in reading 16th century handwriting was of great use to W. H. Prescott, the historian. Gayangos lived much in London, where he died Oct. 4, 1897. He compiled a catalogue of the Spanish MSS. in the British Museum, 1875.

**Gayda, VIRGINIO** (1885-1944). Italian politician and journalist. He was born at Rome, Aug. 12, 1885, and studied law at Turin university. In 1921 he became editor of *Il Messaggero*, of Rome, and after Mussolini came to power was made editor of the *Giornale d'Italia*, which became the mouthpiece of the fascist party. After the resignation of Mussolini in July, 1943, Gayda lived in retirement for some months. It was later announced that he had been killed by a bomb, March 14, 1944.

**Gay-Lussac, LOUIS JOSEPH** (1778-1850). French chemist. Born at St. Léonard, Haute-Vienne, Dec. 6, 1778, he was educated at the *École Polytechnique*, Paris, and was at various times professor of chemistry there and

at the Jardin des Plantes, and professor of physics at the Sorbonne. He was elected deputy for Haute-Vienne in 1831, and entered the chamber of peers in 1839.

Gay-Lussac established the fact that all gases expand equally with heat, and on the Continent Charles's Law (see Gas) is called the law of Gay-Lussac. He pointed out that gases always combine in simple proportions by volume, and accepted Dalton's atomic theory as an explanation of this. In collaboration with L. J. Thénard he prepared metallic platinum and studied its properties, did much research on acids and alkalis, and from an examination of prussic acid and its salts described cyanogen as a "compound radicle." In 1804 he had made two balloon ascents, of 13,000 and 23,000 ft., to measure the earth's magnetic field, and the temperature, humidity, and composition of the atmosphere at various altitudes. He died May 9, 1850.

**Gaza or Guzzeh.** Town of Palestine, on the coast, 10 m. N.E. of the Egyptian border. Regarded as the key to Palestine from the S., it was always of strategic importance. In a fertile region on the edge of desert, it lies in the part of Palestine allotted by the U.N. to the Arabs, and in 1948 was occupied by Egypt, which retained possession of it under the armistice with Israel of 1949. Israel captured it in 1956, but under U.N. pressure relinquished it, 1957.

The site of the ancient city is not certainly known. Sir Flinders Petrie identified it with the Bronze Age site Tell el Ajjūl, 5 m. S. of the modern town, where Hyksos remains and fine jewelry were found. Long a dependency of Egypt, in Biblical times it was one of the five chief cities of the Philistines. Here Samson died, "eyeless in Gaza," in Milton's famous phrase. Its king Hanunu (Hanno) vainly defied the Assyrian army in the reign of Sargon, 720 B.C. In 332 B.C. it was captured by Alexander the Great after a siege of five months, and afterwards figured extensively in the chronicles of Maccabees and Muslims, Crusaders and Turks. Napoleon took it in 1799.

**BATTLES OF GAZA.** These were fought between the British and the Turks in March, April, and Nov., 1917. The British advance into Palestine began in Feb., 1917, and the Turks took up a strong position on a front stretching from Gaza to Beersheba. British and Anzac troops attacked on March 26, but retired March 28 in face of Turkish reinforcements. On April 17 the British carried the outer defence line, but failed to carry the key position of Ali Muntar and were beaten off.

On Nov. 2 the first line defences of Gaza were taken and held. The town was kept under continuous bombardment, and, threatened by Allenby's move from Sheria, 16 miles to the S.E. of Gaza, the Turks evacuated the town, so that British and Indian troops occupied it with hardly a struggle on Nov. 7. The whole Turkish position was in British hands next day.

**Gazala.** Town of Libya, N. Africa. It lies between Tobruk and Derna. During the Second Great War it changed hands a number of times. Abandoned by the Italians, it was occupied by the British Jan. 9, 1941. They had to evacuate it in April, and the Germans took it. Recaptured by New Zealand troops on Dec. 17, it was evacuated by the S. African div. garrisoning it on June 14, 1942, in face of Rommel's advance. The 8th army recaptured it Nov. 13. By Nov. 16 the airfields were in use, and from the 18th British fighters from Gazala were able to cover convoys to Malta.

**Gazaland or GASALAND.** Region of Mozambique, S.E. Africa. It is situated on the border of Southern Rhodesia. The country is mountainous, has an abundant rainfall, and is watered by the Sabi and Limpopo. The chief town is Chai Chai on the Limpopo.

**Gazanias.** Genus of perennial herbs of the family Compositae. They are natives of the Cape of Good Hope. The leaves of some species are entire and lance-shaped; of others, deeply cut into narrow segments. The flower-heads are showy, the ray-florets a tint of yellow, and the tubular florets usually of a darker colour. Many of the garden varieties are hybrids.

**Gazebo.** Summer-house built to command a wide view over the surrounding country, corresponding to the Italian *belvedere*. The origin of the word is unknown; it may be a pseudo-Latin future of gaze. Lavabo, I will wash, for a wash-hand basin, is a genuine

formation.) A bow window is sometimes called a gazebo.

**Gazelle** (Arab. *ghazal*). Name given to a genus of small antelopes chiefly found in the desert regions of the E. hemisphere. They are the lightest and most graceful of the antelopes, and usually have remarkably slender legs. The majority of the species are less than 30 ins. high. The upper molar teeth resemble those of the sheep.

**Gazetteer**. Name given to a geographical dictionary or encyclopedia, i.e. a book containing information about towns, rivers, mountains, lakes, etc., arranged in alphabetical order. Gazetteers may be universal, i.e. dealing with the whole world, or local, e.g. a gazetteer of England and Wales. The word referred originally to one who wrote for gazettes, passing thence to those who compiled reference works of the kind in question, and then to such works themselves. In 1695 Laurence Echard brought out *The Gazetteer's or Newsmen's Interpreter*. This was later abbreviated to *The Gazetteer*, and so originated the use of the word in its present connexion.

**Gaziantep**. Town of Asiatic Turkey, in the vilayet of the same name. An old place, formerly known by its Syrian name, Aintab, it stands 65 m. N.N.E. of Aleppo. It trades in hides, sweetmeats, and wine, and makes leather. Pop. (1955) town, 97,144; vilayet, 370,808.

**Gdansk**. See Danzig.

**Gdynia**. Seaport of Poland. Situated on the Gulf of Danzig, about 12 m. N.N.W. of that city, Gdynia was founded in 1920 to give Poland a seaport in place of Danzig, which had been declared a free city. A canal runs from Gdynia to the river Vistula. The chief exports before the Second Great War were sugar, dairy produce, coal, and timber. Gdynia was one of the first objectives of the Germans in 1939, surrendering to them on Sept. 14. The port was bombed by Allied aircraft during the German occupation, and was stormed by troops of the 2nd White Russian army, March 28, 1945. Pop. (est. 1954) 117,000.

**Ge**. See Gaea.



Gazelle. Dorcas gazelle, a native of North Africa  
W. S. Berridge, F.Z.S.

the Col (pass) du Géant (11,057 ft.) leads to Courmayeur in Italy.

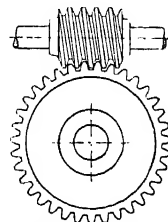
**Gear**. Everything in a machine or installation which serves to transmit motion from one part to another. When two shafts are to be connected so that the ratio of their speeds is to be definite and constant, gearing is used unless the distance between their axes is excessive. This consists of a pair of wheels with teeth cut on their circumference or, if the velocity ratio is large, two or more wheels suitably connected.

If the axes of the shafts are parallel, spur gears (Fig. 2) or helical gears are used; if the axes intersect at some angle (usually a right angle) bevel gears are used (Fig. 1); if the axes do not intersect, skew gears (Fig. 6) or worm gears (Fig. 5) are used.

The velocity ratio should remain constant during the whole time of contact of a pair of teeth, otherwise vibrations and noise would result. This is achieved by shaping each tooth to the form of an involute of a circle. Since perfect accuracy of tooth form cannot be guaranteed, much smoother running is obtained by sloping the teeth in an axial direction, as in helical gears. Since a single slope involves an end thrust, double helical gears are used. Double helical drives transmit power from

a high speed turbine to the low speed propeller of a ship.

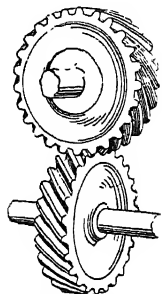
With a single pair of wheels the driving and driven shafts rotate in opposite directions (Fig. 2). With an additional intermediate wheel (Fig. 3) the two shafts revolve in the same direction; this is the principle of one type of reversing gear. The compound



Gear. Fig. 5.  
Worm gearing

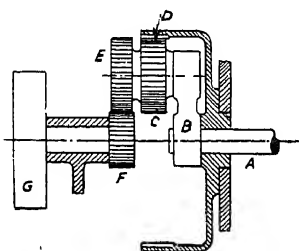
train (Fig. 4) is used where the velocity ratio is large.

Worm gearing (Fig. 5) gives a smooth drive, but with high velocity ratios its efficiency is low. An exception occurs with rear axle worm drives with low velocity ratios, which have an efficiency exceeding 90 p.c. With a single threaded worm as shown, if the wheel has 40 teeth the driving shaft makes 40 revolutions for one of the driven shaft.



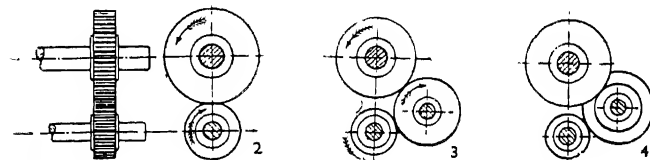
Gear. Fig. 6.  
Skew gearing

A simple form of epicyclic train is shown in Fig. 7. The wheel F



Gear. Fig. 7. Epicyclic reduction gear. For lettering see text

is fixed to the driving shaft with its pulley G. The arm B, carrying wheels E and C, is fixed to the driven shaft A. C gears with a



Gear. Fig. 2. Spur gear. Fig. 3. Showing additional intermediate wheel.  
Fig. 4. Compound train, used where velocity ratio is large



fixed wheel D having internal teeth. It is possible to obtain high velocity ratios with this type in a compact space, with the axes of the driving and driven shafts in the same line. The differential gear on the rear axle of a motor vehicle is a form of epicyclic gear which allows the rear wheels to travel at different speeds along a curved path. *See* Motor Vehicle.

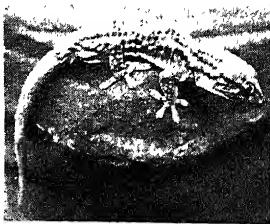
**Gebal.** *See* Byblos.

**Gebel Aulia Dam.** Irrigation dam on the White Nile in the Republic of Sudan, 25 m. S. of Khartum. Built at a cost of £2,000,000 and completed in 1937, it impounds the silt-free water of the White Nile and permits perennial cultivation of some 600,000 acres. The dam is 3 m. long with a maximum height of 60 ft. It has 60 sluices, a lock 60 ft. wide, and impounds a reservoir 200 m. long by 2½ m. wide with a capacity of 3,100 million cubic metres.

**Geber** OR **JABIR** (fl. 8th century). Arabian chemist. Born at Meshed, he joined the Sufis and shared the exile of the Barmecide viziers of Haroun-al-Raschid. He died probably at Cufa, and is said to have been alive in 813. His reputation in the Middle Ages was that of the greatest chemist of all time. Translations into Latin exist of his *Book of the Seventy* of *Johannis*; *Book of Poisons*; and *Great Book of Properties*. His complete works in English appeared in 1928. *See* Alchemy.

**Gebweiler.** German form of the name of the town called in French Guebwiller (*q.v.*).

**Gecko.** Family of small lizards, common throughout warmer climates and everywhere in the tropics. They are of dull colour, with many tubercles on the skin, and have a somewhat repulsive appearance. In most species the toes act like suckers and enable the animals to ascend window panes and run about ceilings. They live on insects and are harmless.



**Gecko.** The S. European wall gecko, *Tarentola mauritanica*

**Geddes, AUCKLAND CAMPBELL** **GEDDES**, 1st **BARON** (1879–1954). British politician, diplomatist, and business man. Younger brother of Sir Eric Geddes (*q.v.*), he was born June 21, 1879, educated in Edinburgh, and became a doctor. After active service in the South African War, he was professor of anatomy at the Royal College of Surgeons, Dublin, and at McGill University,

Montreal (to which he returned as principal, 1919–20). Serving in France in the First Great War, he obtained the honorary rank of brigadier-general, returning in 1916 to become director of recruiting at the war office. His success there commended him to the premier. Lloyd George, who appointed him minister of national service, Aug. 1917. He was knighted, and became Unionist M.P. for Basingstoke and Andover, a seat he held until 1920. Meanwhile he had been made a privy councillor (1918), president of the local government board (1918), minister of reconstruction (1919), president of the board of trade (1919–20). In March, 1920, he was appointed British ambassador to the U.S.A., holding that position until 1924, when he entered upon a business career. Raised to the peerage in 1942, he published *The Forging of a Family* (memoirs) 1952, and died Jan. 8, 1954.

**Geddes, ANDREW** (1783–1844). Scottish painter. Born in Edinburgh, April 8, 1783, he entered the R.A. schools in 1806, and was elected A.R.A. in 1832. He painted several scriptural subjects, *The Discovery of the Regalia of Scotland* (1818), and exhibited at the R.A., 1821. The portrait of his mother (in the Scottish National Gallery) is deemed his masterpiece, but those of George Sanders, Sir David Wilkie, Patrick Brydone, and Dr. Chalmers are notable specimens of his skill. He died May 5, 1844.

**Geddes, SIR ERIC CAMPBELL** (1875–1937). British business man and politician. Born in India, Sept. 26, 1875, he was educated at Merchiston Castle school, Edinburgh, then went into railway administration, first in America, then in India, and in 1903 with the North Eastern Rly., of which he was soon deputy general manager. During the First Great War he rose

rapidly, together with his brother Auckland, later Baron Geddes (*q.v.*), to wider power. Lloyd George appointed him deputy director-general of munitions supply, 1915. On Haig's staff in France as director-general of transport, 1916, he was then given authority over military railways in all British theatres of war. In 1916, too, he received a knighthood.



**Sir Eric Geddes.**  
British politician

Early in 1917 Lloyd George made him navy controller, then, later the same year, first lord of the admiralty. He became Unionist M.P. for Cambridge the same year, retaining the seat until 1922.

In Lloyd George's post-war coalition government he was minister without portfolio, 1919, and became the first minister of transport, 1919–21; but he is best remembered for his work in 1921–23 as chairman of a committee to advise on national expenditure, a committee which gave rise to the notorious phrase "the Geddes axe," in reference to the drastic economies recommended. Returning to business life, he became chairman of the Dunlop Rubber Co., in 1923, and later, for a time, of Imperial Airways, Ltd. He died June 22, 1937.

**Geddes, JENNY.** Scottish kail-wife or vegetable seller. She is famed for having started a riot in S. Giles's cathedral, Edinburgh, by hurling a stool at the dean who read Laud's liturgy there for the first time, July 23, 1637. A stool said to be hers is in the Antiquarian Museum, Edinburgh.

**Geddes, SIR PATRICK** (1854–1932). British scientist and social reformer. Born Oct. 20, 1854, at Perth, and educated there, he studied under T. H. Huxley at University College, London, and became demonstrator in physiology. He was lecturer in zoology at Aberdeen, in botany at Edinburgh, in natural history in the school of medicine, Edinburgh, and then professor of botany at Dundee, 1883–1919. He took a leading part in educational and social work in Scotland, and helped to found university hostels in Edinburgh, Chelsea, and India.

Geddes was director of the Cities and Town Planning Exhibition. In 1919 he was engaged by the International Zionist Commission to plan the reconstruction of Jerusalem and its proposed university. His chief books were *The Evolution of Sex* (with J. A. Thomson), 1889; *Cities in Evolution*, 1913; and he wrote on biology and botany. In 1932 he was knighted, but died April 17. *Consult* Life, P. Boardman, 1946.

**Gee.** Radio device developed by the R.A.F. during the Second Great War to enable bombing aircraft to establish their position

accurately by day or night in all degrees of visibility. Gee consisted of a series of radar signals transmitted from a number of ground stations. These signals actuated a receiver in the aircraft, and their time-lag gave the navigator his position relative to the target. The impulses were directed towards the bomber's target, and, in conjunction with another device called Oboe, enabled precision high-altitude bombing to be carried out in any visibility and irrespective of camouflage concealing the target. Gee was first put into operation in March, 1942, and, covering an arc from Great Britain to the Elbe, Hanover, Cassel, and Mannerheim, enabled the R.A.F. to plan 1,000-bomber raids. Gee was later used in civil aviation.

**Geel.** See Gheel.

**Geelong.** Second largest city of Victoria, Australia, in Grant co. It stands near the head of Geelong Harbour, an arm of Corio Bay, 45 m. by rly. S.W. of Melbourne, and is the port for the Western Plains wool and wheat, for the accommodation of which there is wharfage capable of taking ships of the largest tonnage. Industries are concerned with textiles, cement, salt, rope, unbreakable glass, fertilisers, tanning, wool scouring, and engineering. Here are the Australian headquarters of the Ford Motor and International Harvester companies. Pop. (1954) 72,349.

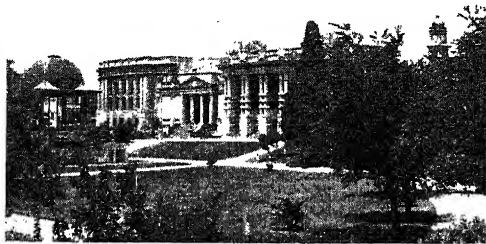
**Geelvink Bay** (*Geelvink*, Dutch, yellow finch). Inlet on the N. coast of Dutch New Guinea, between Cape Mamori and Cape D'Urville. It penetrates 120 m. inland, and is 150 m. wide at its entrance. The bay contains several islands, the chief being the Schouten Islands. Japen Biak, in the Schouten Is., was the scene, in the Second Great War, of fierce battles, May 27-June 20, 1944, between Japanese and U.S. forces, including tanks, before its capture by the Americans. Geelvink Channel is off the W. coast of Western Australia.

**Geer, Louis Gerhard, Baron de** (1818-96). Swedish statesman and writer. Born at Finsjö, July 18, 1818, he became president of the supreme courts in 1855. He was minister of justice, 1858-70,

and again in 1875, and while occupying that position introduced the measure establishing two chambers with popular representation, 1866. During 1876-80 he was president of the ministry. He was the author of many volumes of essays, stories, and biography, and published a volume of *Reminiscences* in 1892.

**Geestemünde.** This German port on the North Sea was made part of Wesermünde (*q.v.*) in 1904.

**Geffcken, Friedrich Heinrich** (1830-96). German statesman and lawyer. Born at Hamburg, Dec. 9, 1830, he studied law at Göttingen and Berlin, and entered the Prussian diplomatic service in 1854. Serving successively in Paris, Berlin, and London, he became a close friend and adviser of Prince Frederick William of Prussia, later the emperor Frederick III. He framed the federal constitution of the German Empire, 1870-71, and



Geelong, Victoria. Civic Centre in Johnstone Park, one of the amenities of this important Australian city

became professor of constitutional history at Strasbourg in 1872.

In 1888 a heated controversy arose on his publication of extracts from Prince Frederick William's war diary calculated to lessen the ascendancy of Bismarck, and Geffcken was indicted for high treason, but acquitted. He died at Munich, May 1, 1896. Among his many writings are *State and Church*, 1875, Eng. trans. 1877, and a volume of essays, Eng. trans. as *The British Empire*, 1889.

**Geffrye Museum.** London museum of furniture design and craftsmanship. Opened in 1914, it is situated in the Kingsland Road, near Shoreditch Church, and is housed in the old Geffrye, or Ironmongers' Almshouses, founded by Sir Robert Geffrye, or Geoffrey (1613-1703), lord mayor of London and master of the Ironmongers' Company, and opened in 1715. The 14 almshouses and chapel stand round three sides of a court. The collection, partly permanent, partly on loan, includes specimen rooms of dates from

1600 to the present, carved mantelpieces, doorways, and grates, and much beautiful furniture. It is open free daily, except Mon.

**Gefle.** Seaport of Sweden, and capital of the län or govt. of Gefleborg. It stands at the mouth of the river Gefle, 112 m. N.N.W. of Stockholm. The river here branches into three arms, forming two islands, on which, and on the main shores, the city is built. It is the chief port for the Kopparberg timber and iron district, exporting timber, wood pulp, iron, and joinery. Fishing is extensively engaged in, and there are shipbuilding yards and manufactures of cloth, cotton, machinery, leather, and tobacco. Gefle has a 16th century castle, a town hall, library, technical schools, and theatre. Pop. 41,986.

**Gefleborg** or **GÄVLEBORG.** Maritime län or govt. of Sweden. Bounded on the E. by the Gulf of Bothnia, its area is 7,609 sq. m. Its coastline is much indented by small bays, the chief of which is Gefle Bay, in the S.E., and the shores are fringed with numerous islands, none of any great size. Gefle is the capital and chief seaport, other seaports being Soderhamn and Hudiksvall. Of many lakes, the largest is Dellen in the N.E. Rivers are numerous but short, and mostly drain into the Gulf of Bothnia. Pop. 275,528.

**Gegenschchein** (Ger. counter-glow). Faint patch of light several degrees in diameter appearing on moonless nights as a brightening of the zodiacal light (*q.v.*) diametrically opposite the sun. The light is probably sunlight reflected from small meteoric particles scattered throughout a disk-shaped region extending from the sun beyond the earth's orbit. At full phase the individual particles would be brightest, hence the bright patch opposite the sun. Particles  $\frac{1}{8}$  in. in diameter and 5 m. apart could produce the observed light intensity.

**Gehazi.** Servant of Elisha, in 2 Kings chaps. 4, 5, and 8. He was struck with the leprosy of which Naaman the Syrian was cured for having extracted presents from the latter in the name of Elisha.

**Gehenna.** Name in Biblical and post-Biblical literature of a place of fiery torment. It is derived from Ge-Hinnom, the Valley of Hinnom, a valley on the W. of Jerusalem in which the refuse of the city and the bodies of animals and criminals were burned. In Matt. 5, v. 22, and 10, v. 28, A.V., the word is translated hell.

**Geiger Counter** or **GEIGER-MÜLLER COUNTER**. Instrument for detecting radio-activity and counting atomic particles. A thin wire as anode is surrounded by a metal cylinder as cathode; these are sealed in an airtight enclosure filled with argon (or krypton), at about 5 cm. Hg. The anode is connected through an amplifier to a pulse recorder. A single atomic particle entering the space between wire and cylinder ionises the gas and the flow of electrons to the cathode produces a pulse. If 1 cm Hg. of alcohol vapour (or methane) is added, the pulse is rapidly quenched. By varying the H.T. voltage across the electrodes different forms of discharge are obtained and different kinds of particles can be identified.

**Geijerstam**, GUSTAF AF (1858-1909). Swedish novelist. Born Jan. 5, 1858, he graduated at Uppsala and worked as a journalist at Stockholm during 1884-93. Among his many novels may be mentioned *Deathly Cold*, 1882; *Pastor Hallin*, 1887; *The Head of Medusa*, 1895; *Astray in Life*, 1897; and the semi-autobiographical *Book of Little Brother*, 1900. He also wrote witty peasant comedies.

**Geikie**, SIR ARCHIBALD (1835-1924). British geologist. Born in Edinburgh, Dec. 28, 1835, he was educated at its high school and university. He entered the geological survey in 1855, and became director of the geological survey of Scotland in 1867. Meantime he had made a reputation as a popular writer on geology in *The Story of a Boulder*, 1858, and *Scenery of Scotland*, 1865. In 1871-82 he was Murchison professor of geology and mineralogy at Edinburgh.

Foreign secretary of the Royal Society, 1890-94, and secretary, 1903-08, he did his main work as director-general of the geological survey of the U.K., and director of the museum of practical geology, 1882-1901. In addition to his *Text-book of Geology*, 1882, he wrote on volcanoes of Great Britain; on scenery and its influence on history and literature; lives of R. I. Murchison and A. C. Ramsay. He was knighted in 1891, and given the O.M. in 1914. A *Long Life's Work*, reminiscences, appeared 1924. He died Nov. 10, 1924.

**Geiseric**. See *Gaiseric*.

**Geisha**. Girl in Japan trained as an entertainer. Taught music, dancing, singing, and the art of conversation from an early age, these professional singing and dancing girls are engaged to tell stories, provide music, and dance

at dinner parties and receptions, to amuse and enliven the party by repartee, etc. *Pron.* Gay-sha.

**Geisha**, THE. Musical comedy, written by Owen Hall (James Davis), composed by Sidney Jones, and produced at Daly's Theatre, London, April 25, 1896, where it ran for 760 performances. Many of the lively airs, e.g. *Chin-chin Chinaman*, *The Amorous Goldfish*, and the sentimental ballad *Star of My Soul*, have long outlasted the libretto in popularity.

**Geissler**, HEDRICH (1814-79). German inventor. Born in Saxony, May 26, 1814, he became a glass blower. For some time he lived in Holland, where he made a number of useful experiments. In 1854 he settled at Bonn, and there he died, Jan. 24, 1879. He invented a sealed glass tube called the Geissler tube, which was used to examine the passage of an electric current through rarefied gases.

**Gel**. Name given to a colloidal system which occurs as a more or less elastic solid enclosing a part or all of the dispersion medium. See *under* Colloids.

**Gela**. Seaport of Sicily, in the prov. of Caltanissetta. It lies on the S. coast, 60 m. W. of Syracuse. Under the tyrants Cleander, Hippocrates, and Gelon, Gela was the chief city of Sicily; but Gelon transported half its inhabitants to Syracuse, and Phintias of Agrigentum moved the rest, 280 B.C., to a town he founded. On the deserted site the Emperor Frederick II built Terranova, to which Mussolini restored the name Gela. Pop. (1951) 42,526.

**Gelasius I** (d. 496). Pope 492-96. Called on to deal with the schismatic followers of Acacius at Constantinople, he tried in vain to reconcile the Eastern Church to Rome. In this and in other matters he strongly maintained the supremacy of the Roman see. He was responsible for putting a stop to the *Lupercalia* (q.v.) at Rome, and for the establishment of ordinations at fixed times, i.e. Ember days. He has given his name to one of the three earliest Sacramentaries or Service books, *Sacramentarium Gelasianum*.

**Gelatine** (Fr. *gélatine*, Lat. *gelatus*, frozen). Constituent of animal tissues, bones, hoofs, etc., which

forms a transparent jelly when dissolved in water. Gelatine is essentially a purified form of glue.

The product is obtained by boiling raw materials in water, skimming and straining the liquid, evaporating the solution at a low temperature, and drying by exposure to the air.

Gelatine is largely used for culinary purposes; as a basis for photographic sensitive surfaces; in bacteriology; as a size for paper; in dyeing; and in making printers' ink rollers. It is soluble in glacial acetic acid, when it

loses its gelatinising power, but the solution forms a useful cement for glass. When gelatine solution is treated with a bichromate salt, allowed to solidify and exposed to light, the gelatine becomes insoluble. This property is used in the carbon process of photography, and the making of washable distempers.

**Gelatine Dynamite**. Industrial high explosive intermediate in power between blasting gelatine and gelignite. The gelatine compositions have been developed by replacing part of the nitroglycerine in blasting gelatine with oxygen-positive ingredients such as the nitrates of potassium, sodium, and ammonium. Carbonaceous material usually of vegetable origin is added to take up excess oxygen liberated in the explosion. These compositions are applied in iron-stone mining and in chambering fairly hard rock. See *Blasting Gelatine*; *Explosives*.

**Gelderland**, GUELDERLAND, OR GUELDERS. Province of the Netherlands, formerly a duchy of the Empire. Bounded by the Yssel Lake on the N. and by German territory on the S.E., it adjoins the provs. of Utrecht, S. Holland, N. Brabant, and Overijssel, and is watered principally by the Lower Rhine, Waal, and Yssel, while the Maas (Meuse) forms the S. boundary. The good pasture supports large numbers of cattle, small estates predominating in the agricultural districts, and corn, flax, beet, and tobacco are important crops.

The capital of the province is Arnhem, other important towns being Zutphen, Nijmegen, Apeldoorn, Elburg, Zevenaar, Wageningen. The province has several main rly. lines and many narrow-gauge steam-tramways; the Grift and Apel-



Geisha or dancing girl of Japan, in typical costume

doorn canals are notable. Though generally flat, the country is attractive. (For the bitter battles of 1944 and 1945, see Arnhem; Netherlands; Second Great War.) Area, 1,940 sq. m. Pop. 970,296. Gelderland was part of the Frankish kingdom of Austrasia. It was made a county by the emperor Henry IV in 1079 for Gerard of Wassenburg, whose descendants became its hereditary rulers. Reynald I was defeated by John of Brabant at Woeringen, 1288, but his son Reynald II extended and strengthened his domains, which were erected into a duchy by the emperor Louis V in 1339. Dynastic quarrels marked the middle of the 14th century, and in 1379 the succession fell to William of Juliers.

Duke Arnold of Egmont ceded the duchy to Charles the Bold of Burgundy in 1472, the latter succeeding in 1473, though strongly opposed by the estates, i.e. a body representative of the nobility and the chief towns. Arnold's son, Adolph, succeeded Charles in 1477. In 1483 Maximilian of Austria assumed suzerainty, but he was challenged by Charles of Egmont, who ceded the duchy to William of Cleves in 1538. In 1543 Gelderland passed to the emperor Charles V, remaining a Hapsburg fief until it became one of the United Provinces in 1578.

Occupied by Louis XIV, 1672-73, part of the province went to Prussia in 1713. The French revolutionary armies invaded it in 1794, and from 1810-14 it was in the French possessions as the dept of Roer. In 1814 it finally became part of the kingdom of the Netherlands (q.v.).

**Gelée, CLAUDE** (1600-82). French painter. He is usually known as Claude Lorraine, from his birthplace,



Claude Gelée,  
French painter  
From an old portrait

Chamagne in Lorraine. Going to Italy as a youth, he was employed in Rome for some years by the landscape painter, Tassi, who aided and encouraged him. He did much open-air

sketching, the foundation of his great powers as a landscape painter, and left Tassi in 1625. He then travelled widely, working in Venice, France, and Nancy, returning to Rome in 1627. His pictures soon secured him patrons, and thereafter he was steadily at work. To guard against the frequent forgeries of his works, he compiled the six volumes of *Libri di Verità* (Books of



Gelée. Embarkation of S. Ursula. Painted by Claude Lorraine for Cardinal Barberini in 1646, now in the National Gallery, London

Truth), in which he drew sketches of all pictures leaving his studio, giving details of dates and ownership. These now belong to the duke of Devonshire, but were reproduced and published in 1777. Claude died at Rome, Nov. 21, 1682.

His works are marked by a richness of detail and grandeur of composition which few of the classical landscape painters have approached. His intimate knowledge of nature, coupled with his delicate sense of colour, produced many scenes of surpassing beauty, although he was quite unable to paint the human figure adequately, sometimes being obliged to have his figures inserted by other hands. Good examples are to be found in the National Gallery, London, especially the Marriage of Isaac and Rebecca, and the Embarkation of the Queen of Sheba.

**Gelert.** Hound given according to tradition by King John to his son-in-law, Llewellyn, in 1205. The story runs that Llewellyn, returning from a hunt at which Gelert had been missing, was met by the dog covered with blood. Hurrying into his castle he found his infant heir's cradle overturned and blood-stained, and slew the dog believing that it had killed his child; only to find, too late, that the faithful dog had killed a wolf that had attacked the boy. Gelert's grave is shown at the village of Beddgelert, in Wales, near Snowdon. Different forms of this story were common in Europe long before the date assigned to Gelert; it is probably of Eastern origin.

**Gelibolu.** Turkish form of Gallipoli (q.v.).

**Gelignite.** Industrial high explosive. It is used for blasting where a cheaper and less violent explosive than blasting gelatine is required. The standard gelignite contains about 60 p.c. of nitroglycerine, which has been made to the consistency of thin jelly by the solution in it of 4 p.c. of collodion cotton, 27 p.c. of potassium nitrate, and 9 p.c. of woodmeal. A little calcium carbonate and some moisture are present. Gelignite is not so local in its action as blasting gelatine, rocks over a wide area being split into larger fragments.

**Gelimer.** Last Vandal king. A descendant of Gaiseric, he made himself king of the Vandals in 530 by overthrowing his kinsman Hilderic, whom a little later he murdered. He ruled over the Vandal kingdom in Africa for about four years. In 533 his kingdom was attacked by the Romans. A force under Belisarius landed in Africa, and met the Vandals in battle 10 m. from Carthage. There Gelimer's force was routed, and Carthage was entered. However, the king assembled a new army, and a second time gave battle to Belisarius. This took place in Dec., about 20 m. from Carthage, and ended in the defeat of the Vandals. Gelimer fled, but in March, 534, he surrendered. He walked as a captive in the triumphal procession of Belisarius at Constantinople, afterwards disappearing from history.

**Gell, SIR WILLIAM** (1777-1836). British antiquary and traveller. Son of Philip Gell, of Hopton, Derbyshire, he was educated at Jesus College, Cambridge, became a fellow of Emmanuel, and studied

at the Royal Academy schools. He was knighted in 1803, on his return from a mission to the Ionian Islands; was chamberlain to Queen Caroline in 1820, and, living thereafter mainly in Italy, died at Naples, Feb. 4, 1836. He wrote a number of authoritative books on the topography and antiquities of Troy, Ithaca, the Morea, Pompeii, and Rome, most of them illustrated from his own sketches.

**Gellert**, CHRISTIAN FÜRCHTEGOTT (1715-69). A German poet, Born in Saxony, July 4, 1715, he



C. F. Gellert,  
German poet  
After Anton Graff

was professor of moral philosophy in the university of Leipzig, where his lectures were attended by Goethe. His *Fables*, 1746-48, gained him the name of the La Fontaine

of Germany. His moral writings are characterised by deep religious feeling, and he wrote religious poems which Beethoven set to music, also the hymn which in its English version begins *Jesus lives!* Gellert died at Leipzig, Dec. 13, 1769.

**Gelligaer**. Urban district of Glamorganshire, Wales. It is 14 m. N. of Cardiff, on the Monmouthshire boundary. Its Norman church of S. Cadocus was restored in 1867. Extensive collieries in the surrounding district employ the majority of the pop. Gelligaer is near the site of a Roman hill-fort of the 1st century A.D. The best preserved example of the period. It illustrates with exactitude Josephus's description of a Roman camp. Its four-gated, turreted ramparts enclose  $2\frac{1}{2}$  acres, with headquarters, six barracks, two granaries, and extramural baths. Pop. (1951) 36,159.

**Gellius**, AULUS. Roman writer, who flourished in the 2nd cent. A.D. After studying rhetoric and philosophy at Rome and then at Athens, he returned to Rome, where he was entrusted with certain judicial functions. He was the author of *Noctes Atticae*, or *Attic Nights*, so called from having been begun during his stay in Athens, a miscellany in 20 books, of which the eighth is lost. This work has been preserved, in the form of quotations, fragments of earlier writers whose works have perished, and contains conversations with learned men on linguistic and literary matters.

**Gellivare**. A town of Swedish Lapland, in the govt. of Norrbotten. It is 116 m. by rly. N.N.W. of Lulea, and there is also rly. connexion with Narvik, at the mouth of the Ofoten Fjord, on the W. coast of Norway. It owes its importance to the extensive iron mines of Ma'mberg, a hill 2,026 ft. high, with a mining village. The deposits are among the richest in the world, and a million tons of iron have been exported yearly. The town itself is substantially built, and possesses an old Lapp chapel and an ancient cemetery.

**Gelnhausen**. Town of West Germany in the *Land* of Hesse. Situated on the Kinzig, a tributary of the Ma'n, 14 m. E.N.E. of Hanau, it carries on a variety of industries, especially the manufacture of rubber goods. Gelnhausen has a distinguished past, having been an imperial town from 1169 to 1803. On an island in the Kinzig are the ruins of a Romanesque castle built by Barbarossa, in 1190. There is a notable church, the Marien Kirche, in the town, dating from the 13th century. Pop. 5,200.

**Gelo** (Gr. *Gelōn* : d. 478 B.C.). Tyrant first of Gela (491) and afterwards of Syracuse (485) in Sicily. In the second Persian war he offered a force of 30,000 men to help the Greeks against the Persians, on condition that he should have the sole command. This the Greeks refused, but Gelo had an opportunity of distinguishing himself nearer home, when Sicily was invaded by the Carthaginians with an immense force under Hamilcar. This force Gelo defeated at Himera in 480 on the very day on which the Greeks gained their victory over the Persians at Salamis. A wise and beneficent ruler, he was styled the saviour of his country, and after his death (478) was honoured as a hero. *Pron.* Jee-lo.

**Gelsemine** (Ital. *gelsomino*; Arab, *yasmin*, jasmine). The chief alkaloid contained in yellow jasmine (*Gelsemium sempervirens*), another alkaloid, gelseminine, being also present. Gelsemine is extracted from the finely powdered root by means of alcohol. It is very poisonous, and like strychnine has an intensely bitter taste. The total alkaloids present in the gelsemium root is about 0.25 p.c., three-fourths of which consists of gelsemine. It is considered, however, that the medicinal activity of the drug is due to the gelseminine. The tincture of gelsemium is prescribed for neuralgia.

**Gelsenkirchen**. German city, in N. Rhine-Westphalia, centre of the Ruhr coal industry. It stands on the canalised Ennscher and the Rhine-Herne Canal. 15 m. W. of Dortmund. Gelsenkirchen is the most striking example of German industrialisation; in 1847 its pop. was 600, in 1900, 30,000, and in 1939, 313,003. Through the adjoining towns of Wattenscheid and Steele, it links up with Bochum to E. and Essen to W., forming one huge industrial settlement of  $1\frac{1}{2}$  million people. Gelsenkirchen had impressive public buildings before its destruction in air raids of the Second Great War; it was entirely modern, except for the Renaissance castle Horst, dating from 1559. There were two museums, an art gallery, excellent hospitals and sanatoria, a huge People's House (T.U. centre), and several public parks.

Some 24 coal mining enterprises worked 61 pits within the precincts of the city. Iron and steel products, ovens and heating apparatus, glass, and chemicals were also made at Gelsenkirchen. The town was in a desolate state when captured by the U.S. 9th army on April 11, 1945, after several days' fighting; but mining was restarted almost at once.

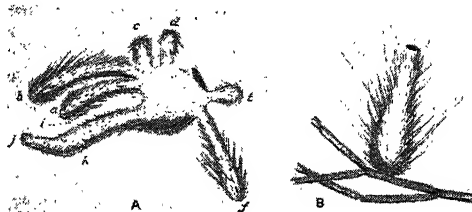
**Gem**. Name given to precious stones, especially diamonds, rubies, sapphires, topazes, and emeralds after they have been cut and polished. It is used in a secondary sense for cameos, and the less precious stones, e.g. agates, garnets, jaspers, onyxes. By a quaint conceit the Romans divided gems into male and female according to the depth or lightness of their colour. See *Precious Stones*; also *Artificial Gem Stones*.

**Gemini** OR THE TWINS. One of the ancient Ptolemaic constellations. Castor and Pollux form the heads of the Twins. Their feet stand on the Milky Way.

**Gemma Galgani** (1878-1903). Italian saint. Born at Camigliano, Tuscany, March 12, 1878, she suffered from tuberculosis of the spine. After an apparition to her of S. Gabriel of the Sorrows she was instantaneously cured, but later had periodically recurring stigmata. A life devoted to piety and charity, during which she claimed to receive heavenly visitors, ended on April 11, 1903, at Lucca. She was canonised in 1940, because she had practised Christian virtues to an heroic extent.

**Gemmation** OR BUDDING. In biology, a term sometimes used for a method of asexual reproduc-

tion, occurring in lowly organisms, which involves the formation of a new individual by the outgrowth and separation of part of the body of the parent. Botanists generally prefer the term gemmation, since for them budding applies to the expansion of buds, e.g. of



**Gemmation.** A. Piece of sponge laden with buds a-f; i, spicules of buds directed away from their free ends; k, spicules of parent directed towards the osculum, i. B. Bud which has been set free and has become fixed by the extremity

From *The Cambridge Natural History*, Macmillan & Co

trees. Zoologists incline to the use of the simpler word. The freshwater polyp hydra, reproduces under suitable conditions by budding; a bulge appears on the side of its body, enlarging and growing in complexity until it resembles its one parent. Then this "branch" of the parent body breaks away and becomes independent.

**Gemmi.** Pass or mule-track over the Bernese Alps, Switzerland. It communicates between



**Gemmi Pass.** One of the gorges in the Bernese Alps threaded by a mule track

Frutigen in Berne, and Leukerbad in Valais, and reaches an alt. of 7,640 ft. The track passes the Dauben See, and is often called the Daube Pass. There is an hotel on the summit, giving a remarkable view, including the Matterhorn. Monte Rosa, the Dent Blanche, and the Wildstrubel.

**Gemmule.** Small spherical structure formed in autumn by many fresh-water sponges in which certain cells, strongly protected, survive the winter. In spring these cells, by growth and division, produce a mass of living material, which sometimes spreads through and round the old skeleton from the previous year in which the gemmule has remained. Otherwise the cells, washed to a new site, may give rise to a new sponge altogether. In general, those forms that live in still or nearly still

water have gemmules which float to some extent, and those that live in running streams tend to have gemmules which sink.

**Gemsbok** (*Oryx*). Species of antelope, found in the desert regions of S.W. Africa. It is remarkable for its long straight horns, which sometimes reach a length of 45 ins. The animal is about 4 ft. high, and is grey on the back and sides, with white below. There are black markings on the face, throat, and upper parts of the limbs. It is said that the gemsbok can successfully fight the lion with its horns. The name is Dutch, meaning chamois-buck.

**Gendarme** (from Fr. *gens d'armes*, men-at-arms). Military policeman. In the Middle Ages gendarmes were the French bodyguards of the king, recruited among the nobility. The Revolution created under the same name a militarised state police force, mounted and on foot, which together with its name was soon copied by many European powers. It usually is entrusted, in rural districts, with the tasks and duties performed in towns and cities by the police, and is recruited from among reliable

former soldiers and n.c.o.s. Members bear arms, and in many countries serve in war as military police. Prussia up to 1808 had a regiment of cuirassiers named Gendarmes. In Italy the gendarmes are called Carabinieri, in Spain Guardia Civil, in Turkey Sabtihs, but everywhere their tasks and equipment are similar.



**Gendarme.** French military constable

**Gender** (Lat. *genus*, kind). Classes into which nouns are divided according to sex or absence of sex: sometimes three in number—masculine, feminine, and neuter; sometimes two—masculine and feminine; and in inflexional languages shown by different terminations. But this grammatical distinction is often arbitrary; thus, in Latin *mensa* (table) is feminine, in German *Mond* (moon) masculine, *Sonne* (sun) feminine. In English, grammatical gender does not exist, things without natural gender being neuter. Natural gender, in which sex and gender agree, is shown by special endings (executor, executrix) or by different words (horse, mare; fox, vixen). It is probable that originally the distinction of gender was natural, not grammatical.

**Gene.** A factor of unknown constitution which induces the appearance of a particular character in an organism containing it. Experimental breeding (see Genetics: Heredity; Mendelism) proves that recognizable characteristics are passed from generation to generation according to certain laws. Since material forming part of

one generation initiates the next, it is presumed that the material holds the cause of the resemblance between offspring and their forebears.

Cytogenetical experiment (see Cytology) indicates that genes occur in linear series along chromosomes, and it has been found possible to determine the relative



**Gemsbok,** a long-horned antelope found in South-West African deserts



positions of genes for various characters in the series and so to construct a map showing these positions (loci) in a manner analogous with that in which stations are indicated on maps of railways. Further, extreme magnification of suitably stained chromosomes shows heavily stained portions of chromosomes distributed in a manner corresponding with the distribution of the loci in the maps.

The natural deduction is that the heavily stained regions in the chromosomes are or contain the genes for the characters concerned. This conception is upheld by the fact that, when an aberrant form of organism has arisen spontaneously—a process known as mutation—examination of its chromosomes has often shown one or other of these to be aberrant also, in exactly that position which corresponds to the locus of the gene for the character in which the organism is peculiar. Such results are the basis of the current belief that a gene is a small part of a chromosome. Whether it is a distinct material unit comparable to a chromosome in behaviour though not in size and form, or whether it is simply a localised condition in the chromosome, must still be determined.

**Genealogy** (Gr. *genealogia*). History of the descent of a family. The principal data are places and dates of birth, of marriage, and of death, names of husbands and wives, particulars as to offices held, or professions, of wills proved, and any other particulars. These may be supplemented by a pedigree, or a family tree, in which the growth of a family is shown in the reverse way, the various generations with their armorial insignia being displayed as fruits of a tree, rooted in the founder of the house.

**Genée, DAME ADELINE** (b.1878) Danish-born British dancer. Born



Adeline Genée, in the Dance of Bacchus

at Aarhus, Jan. 6, 1878, she began training as a dancer at eight, and became *première danseuse* at the Copenhagen Opera in 1895. Her success led to engagements at Berlin and Munich. From 1897 to 1907 she danced leading parts at the Empire Theatre, Lon-

don, notably in *The Press*, Feb. 14, 1898, and appeared in an important revival of *Coppélia* under the title *The Dancing Doll*, Jan. 3, 1905. An exponent of the traditional school of ballet, she also appeared with her own company in the U.S.A., Paris, and in Australia. She retired in 1914, but made short reappearances in London in 1915 and 1932. She became British in 1910 by marriage with F. S. N. Isitt (d. 1939). President of the Royal Academy of Dancing, 1920-54, she was made D.B.E., 1950.

**General** or **GENERAL OFFICER**.

Name given to a military officer of almost the highest rank, only field



General. Rank badges on shoulder strap of British general.

marshal being above it. It is used loosely for all officers above the rank of brigadier, as well as for those who are full generals. In the British army there are major-generals (lowest), lieutenant-generals, and generals. The equivalent rank in the navy is admiral, and in the R.A.F. is air chief marshal.

During both Great Wars the commanders of armies were given the rank of general, either temporary or substantive. The term is common to most armies; the French have *général*, *général de division*, and *général de brigade*, and the Germans have a similar order. In the U.S.A. a highest rank of general of the army was created in 1945. The rank brigadier general, abolished in the British army in 1920, was retained in the U.S. army. The word was first used in its present sense about the end of the 16th century. In 1650 Cromwell was made captain-general of the forces of the Commonwealth, and was afterwards known as the lord-general. Marlborough was the captain-general. Later the present forms came into use.

**General**. Title used in the Roman Catholic Church to designate the heads of some religious orders. Under the pope, the general is the supreme head of his order, and exercises authority over the provincials as they, in turn, control the individual communities in their provinces. The general is usually elected by a chapter of provincials for a period varying according to the order from 6 to 12 years; but in the Jesuit order, for life. Salesian and Redemptorist generals are also elected for life. The generals

live at Rome and are under no episcopal jurisdiction save that of the pope. (See Jesuits.)

The title general is also used by the head of the Salvation Army (*q.v.*).

**General Assembly**. The name given to the governing body of a Presbyterian church. As a rule, it meets once a year, consists of both ministers and laymen representing the presbyteries of the church, and is presided over by a moderator. It is the final authority on all matters of belief, church discipline, and order. The general assembly of the Church of Scotland, an established church, differs slightly from those of the unestablished Presbyterian churches: at its annual meeting, held in May, the king is represented by a civilian high commissioner and members are sent thereto from the royal burghs and the universities of Scotland. See Presbyterianism; Scotland, Church of.

**General Election**. Term used for the process of electing the members of a new central or federal, as opposed to a local or regional, government. In the U.K. this means the election of a new house of commons through the exercise of the parliamentary franchise, following a dissolution of parliament. The Act of 1911 reduced the life of a parliament from seven years to five, although there is provision whereby the house of commons may declare a state of emergency to exist and prolong its life by a year at a time. The parliaments sitting in 1914 and in 1939 were both in this manner prolonged because it was thought inexpedient to hold a general election while a European war was in progress. The term of five years, a maximum, is rarely allowed to run out.

To order that a general election be held, writs are issued in accordance with a royal proclamation which dissolves one parliament and summons its successor to meet on a given day. The arrangements for the election in each constituency are in the hands of a returning officer, often the town clerk, who keeps a register of electors. Nominations of candidates being made, each candidate deposits in cash a sum of £150 which is held forfeit if he fails to secure one-eighth of the total votes cast. After the count the returning officer declares the result and issues a certificate to the successful candidate. Each candidate may spend on his campaign up to £450, plus 2d. per head of electors in a county constituency, 1½d. in a borough constituency.

## GENERAL ELECTION RESULTS IN THE U.K. FROM 1874

The election of 1874 was the first in which all votes were recorded by secret ballot. The table shows the number of seats gained at each election by the main historical parties only, ignoring independents, etc.

Date	Resulting Distribution of Seats
1874 (March)	351 Conservative; 250 Liberal; 51 Home Rule
1880 (March)	347 Liberal; 240 Conservative; 65 Home Rule
1885 (November)	333 Liberal; 251 Conservative; 86 Home Rule
1886 (July)	316 Conservative; 196 Liberal; 74 Liberal Unionist; 84 Home Rule
1892 (June-July)	274 Liberal; 268 Conservative; 47 Liberal Unionist; 81 Home Rule
1895 (July)	340 Conservative; 178 Liberal; 71 Liberal Unionist; 81 Home Rule
1900 (Oct.)	402 Unionist; 186 Liberal; 82 Nationalist
1906 (January)	379 Liberal; 157 Unionist; 83 Nationalist; 51 Labour
1910 (January)	274 Liberal; 273 Unionist; 82 Nationalist; 41 Labour
1910 (December)	272 Liberal; 272 Unionist; 84 Nationalist; 42 Labour
1918 (Dec. 10)	338 Coalition Unionist; 136 Coalition Liberal; 48 Unionist; 59 Labour; 27 Independent Liberal; 73 Sinn Féin (seats never taken)
1922 (Nov. 15)	344 Conservative; 143 Labour; 60 Independent Liberal; 57 National Liberal
1923 (Dec. 6)	258 Conservative; 191 Labour; 158 Liberal
1924 (Oct. 29)	415 Conservative; 152 Labour; 42 Liberal
1929 (May 30)	287 Labour; 261 Conservative; 59 Liberal
1931 (Oct. 27)	472 Conservative; 52 Labour; 35 Liberal National; 33 National Liberal; 13 National Labour
1935 (Nov. 14)	385 Conservative; 154 Labour; 32 National Liberal; 21 Liberal; 8 National Labour
1945 (July 5)	302 Labour; 189 Conservative; 13 National Liberal; 12 Liberal
1950 (Feb. 23)	315 Labour; 298 Conservative (including National Liberal); 9 Liberal
1951 (Oct. 25)	320 Conservative (including National Liberal-Conservative); 296 Labour; 6 Liberal
1955 (May 26)	344 Conservatives (including associates); 277 Labour; 6 Liberal

An act of 1928 gave the right of voting at a general election to all men and women over 21 (with a few disqualifications, e.g. lunacy). (Earlier acts are mentioned under Franchise.) Since 1918 all polls have had to take place on the same day—a special act was needed in 1945 to allow towns taking their summer holidays at the date appointed to vote on a different day. Before 1918 the polls were often spread over a period of weeks; and later polls were often influenced by the declared results of earlier ones. Moreover, a defeated candidate in an early poll might still be in time for election at a later poll in another constituency; thus in the

general election 1868, Gladstone, defeated in S.W. Lancashire, was able to stand and be elected for Greenwich. By the Ballot Act of 1872 open voting at the hustings was abolished. Voters must present themselves at the appropriate polling station, except that, by acts of 1943 and 1945, those who, through the nature of their duties (e.g. military service) or for reasons of physical incapacity, cannot attend may arrange to vote by post or by proxy. Each voter has one vote (all plural voting was abolished in 1948).

Certain general elections are remembered by popular descriptive labels, usually invented by the

losing side. Thus, that of 1900 was the "khaki" election (held to have exploited the popularity of the S. African War); that of 1918 was the "coupon" election (see Coupon); that of 1924 was the "red letter" election, in reference to the astutely-timed publication of a subversive letter alleged to have been written by G. Zinoviev (*q.v.*), a Russian Communist leader; that of 1931 was the "doctors' mandate" for healing the country's economic ills.

**General Headquarters.** Administrative centre from which an army commander directs his forces. Here will also be located the commanders of the ancillary services and frequently on active service the air officer commanding, with their respective staffs. In the British army, during the Second Great War, communication between front line troops, advanced command posts, and G.H.Q. was maintained by the G.H.Q. Liaison, or Phantom, Regiment, a special unit formed in Belgium in 1940 equipped with motor cycles, fast cars, and light aircraft. It transmitted messages by special radio sets, using a code the Germans never broke. Some sections were dropped in Normandy before the Allied invasion on June 6, 1944, and others accompanied the airborne and assault troops. They gave the news of the closing of the Falaise gap; reported the movements of the German armour in the Ardennes offensive, Dec., 1944; and announced the Russo-American junction at Torgau. The flash of the regiment was a white P on black.

**Generalisation.** Mental process which, with the aid of abstraction and comparison, discovers the qualities common to a class of individual things and unites them in a single idea called a concept. Generalisation simplifies knowledge by enabling a number of particular ideas to be combined under a single idea; if there were no general ideas, it would be necessary to give a special name to every individual object.

**Generalissimo** (Italian superlative of *generale*, general). Title conferred occasionally upon the commander of a nation's armed forces or of several army groups. This position was held by Foch, in the First Great War, from March 26, 1918; and by Chiang Kai-shek from 1928. Marshal Stalin was created generalissimo of the Soviet Union, June 27, 1945.

**General Medical Council.** Authority appointed under the Medi-

cal Act of 1858 to regulate the qualifications of medical practitioners and exercise disciplinary control in certain professional matters. The council is composed of 27 members chosen by the different universities of England, Scotland, Wales, and Ireland, the Royal Colleges of Physicians, Royal Colleges of Surgeons, and Royal Faculty of Physicians and Surgeons of Glasgow, the Apothecaries' Society of London, and the Apothecaries' Hall of Ireland: five members nominated by the crown through the privy council: and seven members elected by the medical practitioners of England, Scotland, and Ireland. Its principal duty is to keep the medical register, i.e. the list of medical men who hold diplomas granted after qualifying examinations of a proper standard. Unless a medical man is registered he does not possess the privileges restricted by law to members of the medical profession. The council has the right to publish the British Pharmacopoeia. Its disciplinary duties were transferred by the Medical Act, 1950, to a disciplinary committee with power to hear evidence on oath and to compel attendance of witnesses. Appeal lies to the judicial committee of the privy council.

#### General Nursing Council.

Body set up under the Nurses Registration Act, 1919, for the training, examination, and registration of nurses. Having originally 16 elected and 9 appointed members, under the Nurses Act, 1949, it had 17 elected by registered nurses from themselves and 17 appointed by the ministries of Health and Education and the privy council.

**General Paralysis of the Insane.** Progressive disease of the brain due to syphilis, associated with mental and physical deterioration and finally dementia and paralysis. The disease begins from eight to 20 years after infection, and is commoner among males than females, though thorough early treatment of syphilis has much modified the incidence of the condition. Pathologically, essential changes are found in the grey cells themselves and the organism of syphilis can be demonstrated in the nerve tissue.

The onset is marked by loss of emotional control, the patient being easily moved to tears or to anger. He loses all power of judgement, and while he conceives brilliant plans, refuses to recognize practical limitations to achievement. In time, excitability gives

way to lethargy, and the patient becomes indifferent to his surroundings, bedridden, paralysed, and incontinent. Tremor is a prominent early symptom affecting speech and hands. Changes in the higher mental controls cause contraction of vocabulary and poverty of expression. Sexual excitement recedes. Attacks resembling epilepsy are later frequent and may be a cause of death.

Diagnosis depends on the positive reaction of the cerebro-spinal fluid, together with recognition of tremor, mental deterioration, and loss of emotional control. This disease is likely to occur when the blood serum and cerebro-spinal fluid are positive in spite of antisyphilitic treatment in the preceding stages of syphilis.

The condition may be arrested or modified by the induction of a high temperature, for which purpose malaria has been used since 1917, the patient being caused to have some ten rigors after being bitten by mosquitoes carrying malarial infection. Diathermy and short-wave are other accepted methods of inducing this high temperature. Injections of arsenic, coupled with bismuth, and large and continued doses of antibiotic drugs are among remedies used.

**General Service Medal.** First official medal for naval service to be authorised for all ranks of the Royal Navy.



General Service Medal issued in 1847

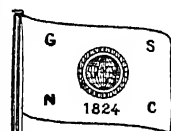
instituted in 1847, it covered the period 1793-1840, and clasps were authorised for 250 general engagements, frigate actions, and cutting-out expeditions. One of the earliest clasps commemorated Lord Howe's victory of June 1, 1794. The medal and clasps were issued in 1848 to survivors of the various engagements, likewise the medal and appropriate clasps to officers and men of the army who had served on board ship as marines.

In 1915 a second naval general service medal was authorised for service in minor operations since 1910 not covered by the campaign medals issued to all services for major wars. The medal has a number of clasps, the first being Persian Gulf, 1909-1914, for officers and men engaged in the suppression of the arms traffic. There is a Palestine clasp for naval opera-

tions there between April 10, 1936, and Sept. 3, 1939. See Medals, colour plates.

**ARMY.** A general service medal for the army and R.A.F. was instituted in 1918 for minor campaigns not warranting a separate medal, bars betokening specific operations. It was awarded for operations in Indonesia and Indo-China 1945-46, with a bar for Palestine 1945-48. The medal has on the obverse the effigy of the sovereign and on the reverse a figure of Victory. The ribbon is purple with a green central stripe. See Africa General Service Medal; India General Service Medal.

**General Steam Navigation Co., Ltd.** British steamship company. Founded in 1824, it has now a fleet of about



General Steam Navigation Co. flag: red on white background

forty vessels. Its services are the carriage of cargo between London and the ports on the E. coast of England: and London and the North Sea ports of Germany, Holland, and Belgium, the French Channel ports, Bordeaux, Oporto, and the Mediterranean. In summer, tourists are taken to Southend, Margate, and Ramsgate. Its headquarters are 15, Trinity Square, London, E.C.3.

**General Strike.** Cessation of work by the general body of wage-earners in the hope of attaining some specified object. The idea of a "sacred holiday month" prepared for and participated in by the entire wage-earning class whose simple "passive resistance" would destroy all existing institutions was put forward in 1831 by William Benbow, a follower of Robert Owen (q.v.), and was among the means of action which the Chartists attempted to use. The British Syndicalist Tom Mann, who was against control of industry by parliament, came out in 1911 strongly in favour of "the general strike of national proportions." General strikes were attempted in Sweden in 1902, 1909, and 1910, and in Belgium in 1913, but the unions were not strong enough to secure complete cessation of work. A general strike resulting in a virtually nation-wide withdrawal of labour took place, however, in Great Britain in 1926.

In 1925, when the miners' agreement of 1921 was about to end, the coal industry was losing money. The mine-owners demanded that

the miners should accept lower wages and longer hours, and a stoppage of work threatened. The government (prime minister, Stanley Baldwin) intervened, setting up a commission of inquiry under Sir Herbert Samuel (*see* Samuel, Viscount) and paying a subsidy meanwhile to maintain the existing wage rate. The commission condemned subsidies, and advocated the continuance of private ownership, with, however, some measure of cooperation in selling and the elimination of waste in management, closing of unprofitable collieries, retention of the existing working hours, and a reduction of wages. Under government pressure, the mine-owners accepted the commission's report as a basis for negotiation; the miners rejected it.

The government subsidy expired on April 30, 1926, and on that day efforts at negotiation between miners and mine-owners by the T.U.C. and the government having failed, the owners posted notices at the collieries that they could no longer employ the miners except at a lower wage. Work in the mines ceased. The general council of the trades union congress (after a meeting at which delegates representing 3,653,000 members voted in favour, and those representing 50,000 voted against, some 300,000 not being represented) announced that it would call a general strike at midnight on May 3-4 unless negotiations had been satisfactorily started.

#### State of Emergency

On Saturday, May 1, the government declared the existence of a state of emergency and took steps to control food supplies, commandeer all forms of transport, and preserve order.

Negotiations between government and T.U.C. continued; but members of the national society of operative printers and assistants, employed by the Daily Mail, refused to handle Monday's issue of the paper as they objected to the leading article dealing with the proposed general strike.

The government thereupon broke off negotiations. At midnight on May 3-4 trains, omnibuses, and trams throughout the country came to a standstill. On Tuesday no London newspapers were obtainable. Wild rumours circulated. On Wednesday, from the offices of the Morning Post, the government issued an official news sheet, the British Gazette (*g.r.*). Some of the newspapers eventually appeared as small news sheets, many printed by cyclostyle. For

the first time, the B.B.C. came to the fore as a disseminator of news and information.

Sir John Simon, from the Liberal benches in the house of commons, startled the trade unions by a speech maintaining that the general strike was not covered by the Trade Disputes Act of 1906, which had given the funds of trade unions immunity from attachment to cover losses caused by industrial disputes.

#### Amateur Train Drivers

By the Saturday trains with amateur drivers were able to make slow cross-country journeys. A skeleton service ran on London tube railways. Omnibuses and trams, a policeman by each amateur driver, ran in the towns.

Three days later Samuel was in unofficial contact with the government, the miners, and the mine-owners. In anticipation of an early settlement of the mining dispute, the general council of the T.U.C. decided on May 12 to terminate the general strike, which by that time had lasted nine days, that night, a decision made public by the B.B.C.

Resumption of work did not prove simple: by striking without notice, many of the trade unions had broken agreements arrived at between them and their employers' unions, and it was another five days before the railwaymen, dockers, printers, and transport workers succeeded in adjusting matters and were allowed to return to work. But the miners were to hold out another six months before, their funds exhausted and a winter of starvation in prospect, delegates decided that the dispute must be ended on any terms.

The general strike of 1926 failed: but to guard against the unlikely possibility of a repetition, the government in 1927 passed a new Trade Disputes Act declaring sympathetic strikes illegal. *See* Trade Disputes Acts.

Irene Clephane

**General Stud Book.** Register of the pedigrees of British race-horses. The first edition was published in 1781. Supplements were issued at regular intervals until 1821, when it became a quadrennial production, the 33rd edition appearing in 1957. This stud book is the only one recognized by all nations: failure of an animal to qualify for inclusion may render its sale abroad impossible. The purpose of the book is to maintain the purity of British blood-stock. It is published by Messrs. Weatherby & Sons, secretaries

of the Jockey Club and National Hunt Committee.

**Generator.** General term for any machine used for generating electricity, *i.e.* converting mechanical energy into electrical energy. The expression D.C. generator is frequently used in place of dynamo as being more exact for a direct-current machine. A.C. (alternating current) generators or dynamos are almost invariably referred to as alternators, except for the so-called asynchronous or induction generator; this is not a true alternator, consisting as it does of an induction motor (*see* Motor, Electric) which is over-run by mechanical means to a speed greater than normal (*e.g.* when a train coasts downhill), and so returns power to the line.

Other types include the so-called lightning, impulse, or surge generator, used to produce artificial lightning strokes of tremendously high voltage and short duration, for research or testing purposes. These may operate on electrostatic principles (rubbing belts, etc.), or consist simply of a set of capacitors (*q.v.*), charged in parallel and discharged in series, to obtain a high voltage. The word generator is frequently used loosely in radio work to denote any assemblage of valves or oscillatory circuits producing a special effect. *See* Electro-magnetic Machine.

**Generoso.** Peak of Switzerland, in the canton of Ticino. It rises from the S.E. end of Lake Lugano, near the Italian frontier, to a height of 5,590 ft., and is ascended by a rack and pinion rly. from Capolago. There is an hotel on a terrace, 3,960 ft., and another on the Kulm, at an alt. of 5,295 ft.

**Genesis** (Gr., origin). First book of the Pentateuch or rather Hexateuch. The name is taken from the Septuagint title, the Generation of the World. The Hebrew title is In the Beginning. The book falls into two main divisions: (a) Creation stories and primeval history, Chaps. 1-11, v. 26; (b) History and stories of the patriarchs, from Chap. 11, v. 27. It is composed of a number of narratives, more or less independent in origin and based upon popular tradition.

Division (a) includes stories of the creation of the universe, of the fall of man, of the deluge, and of the tower of Babel. Division (b) includes an Abraham narrative, a Jacob story, and a Joseph narrative. Some of the stories in these narratives (*e.g.* that of the deluge) bear some resemblance to

stories found in Babylonian and ancient Egyptian literature. The poem known as The Blessing of Jacob, in Gen. 49, is probably one of the oldest pieces of composition found in the Hexateuch. See Bible; Hexateuch; Pentateuch.

**Genet.** Any member of the genus *Genetta*, found almost solely in Africa, with one species in S. Europe. Genets are allied to the civets and mongooses in a group of carnivores called Viveridae. They look something like stoats, but are more slim and graceful. The face is curiously like that of a cat. Genets have short fur of exquisite texture and in many species of beautiful mottled pattern. They are easily tamed.

**Genetics.** Science which observes the resemblances and differences between organisms and seeks to account for them. The earliest genetical studies were simple observations on naturally occurring organisms, leading to little more than broad generalisations. Biometric methods introduced by Francis Galton eliminate the indecision inherent in simple observational studies of heterogeneous material. They depend on the statistical analysis of observations of characters which can be measured, e.g. height and weight, and so serve to show the degree to which groups of individuals resemble or differ from other groups. Such methods also indicate that quantitative differences between individuals may result from either heredity or environment.

Experimental breeding owes its origin to Mendel. It involves crossing closely related individuals which differ in one or a few well defined qualitative ways and in studying the incidence of these differences in the progeny. The method has the advantage that the material is under experimental control; environmental effects may be minimised if not entirely eliminated. It has resulted in the elucidation of the laws governing the distribution to future generations of many if not all potentialities. Cytology has found its major application in discovering, in the behaviour of chromosomes through successive generations, the mechanism of Mendelian inheritance. Neither Mendelian laws of the inheritance of potentialities, nor the behaviour of the chromosomes, however, explain fully why an organism comes to be what it is at maturity. Potentialities undoubtedly pass in the gametes to the zygote, but this cell, in all but the simplest

plants and animals, gives rise to the many kinds which constitute the mature organism. Why the processes of cell division, differentiation, and integration go on as they do during development, it is for experimental embryology to determine. See Heredity.

**Geneva.** A canton of Switzerland, in the extreme W. of the country. Except for a small strip



Geneva arms

of  $3\frac{1}{2}$  m. where it adjoins the canton of Vaud, it is surrounded by French territory. Area, 109 sq. m. The river Rhône flows through it from Lake Geneva, at the S.W. end of which it emerges and receives the river Arve. The surface is fairly level and is mostly covered by market gardens, vineyards, and orchards. Watch-making and the manufacture of jewelry are the chief industries. Next to Basel, this is the most densely populated of the Swiss cantons. The majority of the inhabitants are French-speaking, and half are Protestants and half Roman Catholics. The youngest member of the Swiss Confederation, Geneva became a canton in 1815. The capital is Geneva. Pop. of canton (1950) 202,918.

**Geneva.** Largest lake of Central

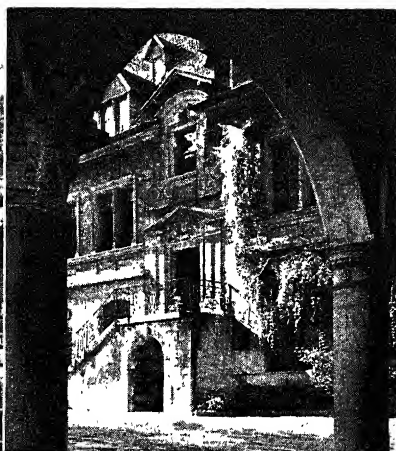
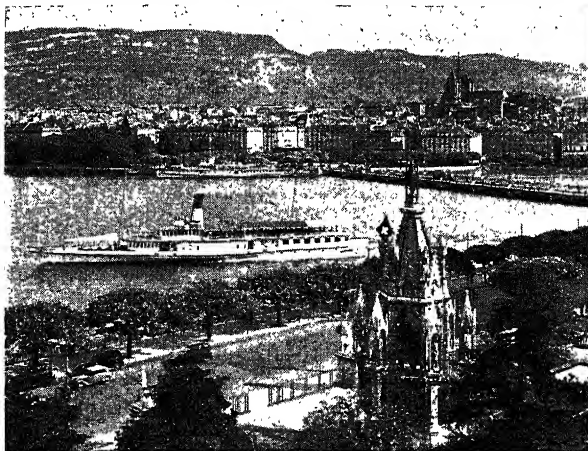
Europe, called by the French Léman. It lies between Switzerland and France. Its length is 45 m., its maximum width is 10 m., and where narrowest, between Pointe de Genthod and Bellerive, it is 2 m. Crescent-shaped, the N. shore measures 50 m. and the S. shore only 45 m. Area, 225 sq. m. Most of the S. shore belongs to the dept. of Haute-Savoie, France, but the remainder is bounded by the Swiss cantons of Geneva, Vaud, and Valais. The surface is 1,220 ft. above sea level, the depth varying between 240 ft. and 1,094 ft. It is an expansion of the Rhône, which enters it as a silt-laden mt. stream at the S.E. end and emerges at the S.W. corner, clear and blue.

The waters of Lake Geneva are of a beautiful deep blue colour and remarkably transparent, especially near Geneva, the silt being gradually deposited and incidentally diminishing the water area. Like most of the Swiss lakes, it presents the phenomenon of the "seiches" or fluctuations in the level of the water, phenomena which are caused by sudden alteration in atmospheric pressure.

The level is higher in summer than in winter, owing to the melting of the snows. It is not so rich in fish life as many other lakes, but lake salmon, trout, pike, and carp are caught. Remains of lacustrine dwellings have been discovered



Geneva. Plan of the city and harbour on the Lake of Geneva



Geneva. Left, a general view of this famous and beautifully situated city, fourth largest of Switzerland. Right, part of the Calvin Academy, founded in 1559  
*Courtesy of the Association des Intérêts de Genève*

on its shores. It is encircled by rlys. and traversed by steamers, the first being built at Geneva in 1823 by an Englishman. The most important towns on its banks are Geneva, Lausanne, Nyon, Coppet, Vevey, Montreux, Villeneuve, Thonon, Évian-les-Bains, and Ouchy. Some of the best-known verses in canto 3 of Byron's *Childe Harold's Pilgrimage* were inspired by this lake. *Consulti Lac Léman*, F. A. Forel, 3 vols., 1892-1904.

**Geneva** (Fr. Genève; Ger. Genf). City of Switzerland, capital of the canton of Geneva. It stands at the S.W. extremity of the lake of Geneva, near the confluence of the Arve with the Rhône, 40 m. N.E. of Chambéry and 256 m. S.E. of Paris. It is the fourth largest town in the country. The old part, which is also the commercial centre, lies on the left bank of the Rhône, which divides the city into two portions, connected by several bridges. Since the demolition of the ramparts in 1849-50, Geneva has rapidly spread, wide streets and commodious quays lining river and lake have been constructed, and breakwaters built to protect the port.

Although a famous religious scientific, and literary centre, Geneva has few public buildings of outstanding interest. The Protestant cathedral, founded in the 10th century and consecrated in the 11th, was rebuilt in the 12th and 13th centuries and disfigured in the 18th by Renaissance additions. More tasteful is the adjoining Gothic chapel of the Macabees, built in 1406 and restored in 1874-88. There are other R.C., Anglican, and American churches. The

town hall dates from the 16th century. The academy, founded by Calvin in 1559, is one of the leading Swiss universities, with a school of international studies.

There are a large, handsome theatre, an athenaeum, and many museums, including the Musée Rath, with pictures and sculptures. There are also historical, natural history, industrial, and archaeological museums, technical schools, and an observatory. The Victoria Hall is a fine building. The city has large manufactures of watches, clocks, musical boxes, scientific instruments, and jewelry, including enamelling and diamond cutting.

Mentioned by Caesar, Geneva became important under the Romans, and the seat of a bishop in the 5th century or earlier. It afterwards belonged to the Burgundians, the Franks, the Empire, and to the counts of Savoy. The prince-bishops of Geneva had a continual struggle to maintain their privileges; this culminated in 1535 in the epoch of unrest caused by the Reformation. The bishop transferred his seat to Gex, and in 1536 Calvin (*q.v.*) came to the city, acquired almost sovereign power, and ruled with a rod of iron in a "Protestant Rome." In the 17th century the dukes of Savoy attempted to recover Geneva, but it was defended by Protestant powers. In the 18th century dissensions arose between the bourgeois and the workers. Geneva was annexed by France in 1792, but upon its liberation in 1815, joined the Swiss Confederation. It was the seat of the League of Nations from its first assembly

in 1920. In 1946 the palace of the League passed to the U.N. for the use of some of its European services. Pop. (1950) 145,473.

**Geneva.** City of New York, U.S.A., in Ontario co. Situated at the N. end of Seneca Lake, 50 m. S.E. of Rochester, it is served by rly. and barge canal. Nursery gardening is carried on, maize and vegetables are canned, and furnaces, radiators, enamelware, optical requisites, cutlery, and stoves are manufactured. Geneva has an agricultural experimental station. Settled in 1788 it received a charter in 1898. Pop. (1950) 17,144.

**Geneva Convention.** International agreement regulating the treatment of sick, wounded, and prisoners of war, and the protection of civilians in war-time. The death of thousands of wounded after the battle of Solferino (1859) through lack of medical aid, and the endeavours of Henri Dunant, a Swiss doctor who was present, led to the international convention at Geneva for the amelioration of the condition of soldiers wounded in the field (1864). The rules were revised by the Geneva Convention of 1906. As a result of the First Great War, a new convention was made in 1929.

This provides that sick or wounded persons attached to armies must be regarded as prisoners of war and be respected, protected, and cared for without distinction of nationality by the belligerent in whose hands they are. Search must be made for the wounded and dead, who must not be subjected to pillage or maltreatment. All medical units, establishments, and personnel must be respected unless



being used for combatant purposes. Aircraft used as medical transport are protected. Prisoners are not in the power of the individuals who capture them but of the government; reprisals against them are forbidden; they cannot be required to give information except as to their name and rank or regimental number; provision is made as to treatment, food, etc.

Four International Red Cross conventions adopted Aug. 12, 1949, included one concerned with protection of civilians in war-time. This called for the designation in peace-time of "security zones" for wounded, children, orphans, and aged persons; and rules were laid down for the treatment of the inhabitants of occupied countries. The domestic legislation required to make these conventions binding on the U.K. had not been passed up to 1957.

As a compliment to Switzerland, the federal colours reversed—a red cross on a white ground—became the emblem of the medical services. Turkey uses a red crescent, Persia a red sun. The emblem may not be used in peace or war except for the medical services.

**Geneva Protocol.** Agreement outlining procedure for conciliation, arbitration, and forced compliance with League decisions among members of the League, accepted by the 5th League of Nations Assembly, Oct. 2, 1924, but never ratified by the Powers.

**Geneva Spirit** (Dutch *jenever*, juniper, gin). Distilled spirit flavoured with juniper berries. The name is due to the popular confusion of the Dutch word *jenever* with the town of Geneva.

Quantities are made in Holland, notably at Schiedam, whence gin is often called Hollands or Schiedam. See Gin.

**Geneviève** (c. 422 - c. 512). Patron saint of Paris. Born at Nanterre, the daughter of a shepherd, she came under the influence of S. Germanus, and at 15 devoted herself to the religious life, practising a stern asceticism, though not entering a convent. When Paris was taken by Childeric she was tireless in her efforts on behalf of the citizens, and interceded with the king for the prisoners. She founded the church of S. Denis.

and encouraged the people to resist Attila's invasion. Her tomb is in S. Etienne-du-Mont, Paris.

**Genghiz Khan.** See Jenghiz.

**Geniculate Body.** Part of the brain in which the fibres coming from the eyes in the optic tract are sorted out. It is highly probable that here the nervous impulses originating in the reception of light of different wavelengths are analysed to give a perception of colour. It is best developed in the Anthropeidea, where we also find the highest degree of colour vision.

**Genie.** Good or evil spirit, or manifestation between the spiritual and the animal in Oriental mythology. In the Hindu Vedas they are benevolent, but in the stories of The Arabian Nights and other Eastern tales they are often either evil powers or vaguely monstrous slaves of those possessing some power over their services. The plural is genii. See Mythology.

**Genioglossal Process.** On the inner aspect of each side of the front of the lower jaw in man is attached a genioglossal muscle actuating the tongue and used in speech. It used to be considered that the absence of this in fossil skulls meant that the form concerned could not speak, and that its presence indicated the power of speech, but arguments based upon the presence or absence of this process are not now highly valued.

**Genipap** (*Genipa americana*). Small evergreen tree of the family Rubiaceae, native to tropical America and the W. Indies. The leaves are opposite, leathery and lance-shaped; flowers bell-shaped, white, in clusters.

The juicy fruit is as large as an orange, but tapering towards each end, with a rather thick, greenish-white rind.

**Genissiat.** Village of France, near Bellegarde, dept. of Ain. Situated on the Upper Rhône, close to the Franco-Swiss frontier, it has the second biggest hydro-electric project in Europe (after the Dnieper dam, *q.v.*). This is 320 ft. high and backs up the waters of the Rhône for 14 m. Work was begun in 1938, interrupted by the German occupation, resumed under German supervision until sabotage by the workmen brought

it to a standstill, and construction started again late in 1945. The plant is to contain six 975-ton turbine generators, supplying Lyons chiefly, though some power will reach Paris, 160 m. N.W. Part of the station came into operation in Jan., 1948.

**Genista.** Genus of shrubs of the family Leguminosae. They are natives of Europe, N. Africa, and W. Asia. Native British species are *G. anglica*, needle-furze, and *G. tinctoria*, dyers' greenweed (*q.v.*). See Plantagenet.

**Genitive** (Lat. *genitivus*, belonging to birth). One of the cases (*q.v.*) in the inflexional languages. The term is really a Latin mis-translation of the Greek name *genikê* properly the class-case, expressing in its widest application the relation between one thing and another. The ideas of source, origin, possession, are special aspects of the general meaning. The inflexion survives in the English possessive (John's). See Grammar.

**Genius** (Lat. *genere*, to produce). In Roman mythology, the god of productivity, in a special sense a tutelary divinity. Every man was supposed to be accompanied from the cradle to the grave by his genius, his higher and better self, by whom he was protected and influenced. Special days in a man's life, such as his birthday and wedding day, were made the occasion of festivity and rejoicing, and sacrifice was offered to the genius. Like the individual man, families, cities, states, localities, even baths and theatres, had their genius. In imperial times, the genius of the emperor was an object of worship, even during his lifetime.

In modern language, the word genius is used with various shades of meaning. It denotes special aptitude for a particular branch of learning, as a genius for mathematics; distinguishing qualities or characteristics, as the genius of the Anglo-Saxon; outstanding ability and a person possessed of such. See Demonology.

**Gennevilliers.** Port of France, officially inaugurated July, 1950. Situated on a bend of the Seine, north-west of Paris, it enables seagoing traffic to reach Paris without trans-shipment. It covers nearly 1,000 acres, and eight ships can unload at the same time.

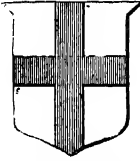
**Genoa.** Prov. of N.W. Italy, sloping from the Apennines to the Ligurian Sea. Its area is 1,582 sq. m. Curving round the Gulf of Genoa and protected by mts., the coastal tract, called the Riviera, is a famous winter resort. Fertile



Genipap. Foliage and flower head of this tropical tree

and intensively cultivated, it produces fruit, flowers, oil, and wine. The people are hardy and industrious, and make excellent seamen. Ironworking and textile manufactures are carried on. Pop. (1951) 923,607.

**Genoa** (Ital. Genova). City and seaport of Italy, the capital of the prov. of Genoa. It stands at the head of the Gulf of Genoa, between the rivers Bisagno and the Polcevera, 74 m. S.E. of Turin. The chief commercial port of the country, it is the seat of an arch-



Genoa city arms

bishop, and possesses a university. The present walls, the third of a series, extend up the slopes of surrounding hills whose summits are crowned with strong forts, batteries, and outworks, enclosing detached houses, terraced gardens, orange groves, and open country. Erected in 1626-32, their circuit is nearly 12 m., and they are pierced by eight gates.

The old part of the city has short, narrow, and dark streets. The cathedral, founded in 985, and rebuilt early in the 12th century, has since been much altered. There are many other churches of the 11th, 12th, 13th, and 15th centuries. Of the many Renaissance palaces, the most im-



Genoa. Map of the province, showing the principal resorts of the Italian Riviera

portant are the Palazzo Municipale, the Doria, the Rosso, the Bianco, the Durazzo-Pallavicini, the Spinola, the Royal, the Balbi-Senarega, and the old palace of the doges. Many are triumphs of architecture, and most contained art treasures and collections of antiquities; both churches and palaces were heavily damaged in the Second Great War.

The city, which is rich in benevolent and educational establishments, has a university, an academy of fine arts, and a Verdi institute of music. The harbour, covering about 550 acres, admits ships of 30 ft. draught. There are a naval harbour, a marine arsenal, and graving, dry, and floating docks—again all heavily

damaged in the Second Great War. Exports in normal times included rice, fruit, wine, oil, silk, hats, hemp, flax, cheese, flour, paper, soap, and marble. The main industries included iron-working, fruit-preserving, sugar-refining, tanning, vesta match and filigree making, and the manufacture of cotton cloth and macaroni.

Genoa was inhabited by Greeks in the 5th and 4th centuries B.C., and was already important in the second Punic War. It was destroyed by Hannibal 205 B.C., and rebuilt by the Romans. On the decline of the Roman Empire it fell under the sway of the Lombards and Franks. Sacked by the Saracens in 936, it developed the spirit of patriotism and independence and the naval prowess for which it has always been distinguished. By an alliance with Pisa against the Saracens, Corsica and Sardinia were jointly won from the Muslims about 1017-1021, but the division of the spoil led to jealousy and a long naval war which ended in the defeat of the Pisans at Meloria, Aug. 6, 1284. During the 11th century Genoa began to take under its protection the towns and territory of the adjoining coast; from the close of the 13th to the middle of the 15th century the Genoese divided with the Venetians the exclusive commerce of Europe in the productions of Asia. Their success in commerce and banking, exciting the jealousy of the Venetians, brought open hostilities. The Genoese were defeated at the naval battle of Chioggia in 1380.

Meantime intestine struggles between the classes, between rival noble families, and the Guelph and Ghibelline feuds, weakened the state, which fell successively under German, Neapolitan, and Milanese dominance. After Chioggia Genoa became subject to France until



Genoa. Plan of the city and harbour of the chief port of Italy

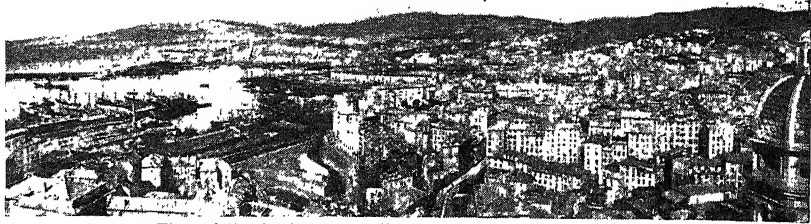
1528. Self-government was restored by Andrea Doria and lasted until the French Revolution and the creation of the Ligurian Republic. In 1800 Genoa suffered a siege by a British fleet and an Austrian army, and capitulated. It was delivered up to the French on their victory at Marengo. Early in 1814 it was taken by the British under Bentinck, but at the peace of Paris the city and territory of Genoa were assigned to the king of Sardinia.

The birthplace of Giuseppe Mazzini, and the seat for centuries of the bankers of the Spanish sovereigns and the outfitters of Spain's fleets and armies, Genoa has been one of the wealthiest, most independent, and prosperous of Italian cities. Population (1951) 683,013.

Docks and munition works were attacked by Allied aircraft during the Second Great War; and on Feb. 9, 1941, the British W. Mediterranean fleet bombarded military targets in and around the port. Towards the end of 1942 Genoa became the main supply port for the Axis forces in N. Africa, and was heavily bombed by the R.A.F. Italian patriots liberated the city from the Germans on April 25, 1945, troops of the U.S. 5th army entering two days later. Fifty-five churches, 13 oratories, three cloisters, 129 palaces and villas, three theatres, and some twenty lesser buildings received damage from air raids; fifteen of these places were listed as damaged beyond repair.

**Genoa, GULF OF.** Extension of the Ligurian Sea, Italy. From Andora in the W. to Spezia in the E. the entrance is 88 m. across, and the gulf penetrates inland to a depth of 32 m. The coastal strip is divided between the Riviera di Ponente on the W. and the Riviera di Levante on the E.

**Genocide.** Term in international law. Coined by Dr. Raphael Lemkin, of Duke university, North Carolina, from Gr. *genos*, race, and Latin suffix *-cide*, from *caedere*, to kill, it means the murder, or attempted murder, of a nation, race or other community. Dr. Lemkin first used this word in his Axis Rule in Occupied Europe, published 1944, though in 1933 he had suggested a treaty declaring attacks on national, eth-



Genoa. View of the harbour and city, and below, the cathedral of S. Lorenzo



nic, or religious groups to be international crimes.

Count three of the indictment of Nazi war criminals at Nuremberg, 1945, included the words: "They conducted deliberate and systematic genocide—namely, the extermination of racial and national groups—against the civilian population of certain occupied territories in order to destroy particular races and classes of people." In this sense, genocide was practised by the Germans on Jews, Gypsies, Poles, Russians and other Slavs. In 1948 the United Nations adopted a convention outlawing genocide.

**Genre** (Fr., kind, sort). Word meaning mode or style, but specifically employed to describe pictures of everyday life, such as domestic interiors, village scenes, and manners. The French apply the term to various classes of painting by adding a distinctive epithet, as in *genre du paysage* for landscape and *genre historique* for history, but this usage destroys the peculiar significance of the word and is not legitimate. See Dutch School of Painting.

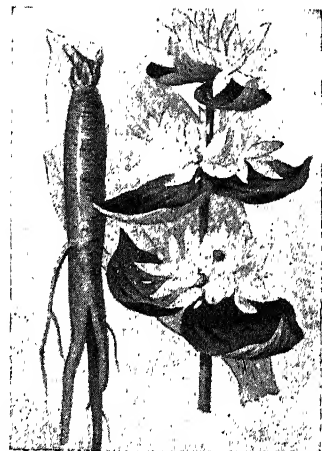
**Gens.** Term applied by the Romans to a body of people regarding themselves as descended from a common ancestor. Among famous Roman *gentes* were the *gens Julia*, the *gens Cornelia*, and

the *gens Fabia*. In Roman names the gens was indicated by the second name, e.g. Caius Julius Caesar. Broadly speaking, a gens was similar to a Scottish clan. See Rome: History.

**Genseric.** Popular, but less correct, name of Gaiseric (q.v.), king of the Vandals.

**Gentian** (*Gentiana*). Large genus of annual and perennial herbs of the family Gentianaceae, natives of all temperate and alpine regions. The leaves are opposite and undivided; the flowers funnel-shaped, purple, yellow, or white. The fruit is a two-valved capsule with many seeds. The flowers of the gentians are among the most beautiful of any plants, the blues often being of a more intense and vivid hue than can be found elsewhere. Of this kind is the *Gentianella* (*G. acaulis*) of the Alps and Pyrenees, where the large flowers appear out of proportion to the small stemless plant that bears them. Another exquisite bit of colour, though on a smaller scale, is the Spring Gentian (*G. verna*), and a taller plant is the Marsh Gentian (*G. pneumonanthe*).

The yellow-flowered *G. lutea* furnishes the gentian-root used in



Gentian. Root, leaves, and flowers of *Gentiana lutea*

medicine. It contains bitter principles and is used for stimulating the flow of the gastric juices and promoting digestion. The official preparations are the extract, dose 2-8 grains; the concentrated compound infusion, dose  $\frac{1}{2}$ -1 fluid dram; the fresh compound infusion,  $\frac{1}{2}$ -1 fluid oz.; and the compound tincture,  $\frac{1}{2}$ -1 fluid dram.

**Gentian Violet.** Commercial dye, a mixture of methyl-violet and dextrin. For medicinal purposes it should be free of the latter. A powerful antiseptic, it is used in the treatment of certain skin diseases.

**Gentiles** (Heb. *gôyim*, Gr. *ethnē*, Lat. *gentes*). Scriptural terms used variously in the O.T. and N.T. Sometimes rendered "nations" and sometimes "heathen," it was originally employed by the Jews in a general sense to mean any nation; or applied figuratively to animals and insects. With the development of the Hebrew idea of "the chosen people" the term Gentiles was applied by them to nations other than themselves. Later, as with Gr. *barbaros*, it became a term of contempt or reproach, but it has been used by Jew and Gentile alike as a synonym for the heathen.

**Gentili, ALBERICO (1552-1608).** Italian jurist. Born at Ancona, Jan. 14, 1552, he migrated to England in 1580. He taught law at Oxford until 1590, when he moved to London, where he died June 19, 1608. His works *De Jure Belli* (On The Law of War), 1588-98; and *De Legationibus* (On Legations), 1585, are among the European foundations of international law.

**Gentleman** (Lat. *gentilis*, belonging to a clan). Term which at different periods has had different and never clearly defined meanings. Patents of gentility conferring a coat of arms without a title were sometimes bestowed by the sovereign, now only by the College of Arms; but the right to wear coat-armour—the test of a gentleman most persistently put forward, and in some circumstances officially recognized—does not always apply. The term is commonly used to indicate certain standards of behaviour. In 1920 the French Academy gave the word a place in the official dictionary of France.

**Gentleman with a Duster.** Pen-name used by H. Begbie (*g.v.*).

**Gentlemen-at-Arms.** Personal bodyguard of gentlemen "extracts of noble blood," established by Henry VIII in 1509 under the title of Gentlemen Speers and reorganized in 1539 as Gentlemen

Pensioners. Except the women of the Guard it is the oldest military corps in England. In 1834 William IV altered its name to the King's Bodyguard of the Honourable Corps of Gentlemen-at-Arms, and in 1862 it was reorganized on a military basis. It now consists of a captain, a lieutenant, standard-bearer, adjutant—styled the clerk of the cheque—a sub-officer, and 39 gentlemen-at-arms, all officers of the regular army who have received decorations. Their office is to attend the royal person on all occasions of public solemnity. See Household, Royal.

**Gentlemen's Agreement.** An understanding based on verbal assurances or the exchange of mere letters without a formal treaty or legal contract being signed. This is not illegal in the U.K. unless carrying it out involves some illegal action.

**Gentz, FRIEDRICH VON (1764-1832).** German diplomatist. Born at Breslau, May 2, 1764, he was educated at Berlin and then studied under Kant at Königsberg. In 1785 he entered the public service of Prussia, and on the outbreak of the French Revolution his literary talents found full play.



FRIEDRICH VON GENTZ, German diplomatist

His uncompromising dislike of the revolution necessitated his quitting Prussia in 1804, and he passed the rest of his life in the service of Austria. He received money for writing against Napoleon. He was secretary to the Austrian representatives at Vienna in 1815, and showed himself as reactionary as Metternich. Gentz died July 9, 1832. His critical essays and memoirs have been published, as have his Diaries, 1800-28. *Consult* Secretary of Europe, G. Mann, 1946.

**Genus.** Group of species whose close resemblance to one another in important features shows them to be related. Genera are distinguished from each other by

greater and more important differences than those that divide the species in the same genus. See Classification; Species.

**Geocentric** (Gr. *gē*, earth; *ken-tron*, centre). Term used in astronomy for specifying the motions and positions of planets, etc., as viewed from the earth.

**Geode.** In petrology, a hollow secretion, or concretion, lined with crystals on the inside walls, occurring in certain sedimentary rocks (usually calcareous or argillaceous), from which it can be removed as a discrete nodule.

**Geodesy** (Gr. *geodaisia*, land division). Branch of applied mathematics concerned with the measurement of the form and divisions of large portions of the earth's surface, or of the earth as a whole. The term is also used to denote the surveying for large civil engineering undertakings, *e.g.* construction of rlys., or irrigation schemes, but does not include surveying plots of land for ordinary buildings.

Eratosthenes estimated the circumference of the earth c. 200 B.C.; Galileo and Newton made similar attempts, but no reasonable degree of accuracy was achieved until 1615, when the Dutch mathematician Snell developed the system of triangulation now known as geodesy. The earth's radius is measured by determining the difference in latitude and the distance apart of two places having the same longitude. Determinations of distances on the earth's surface are made by extensive triangulation from accurately measured bases. Geodesy involves the use of the zenith telescope for latitude measurements and of the transit instrument in conjunction with the chronometer for longitude. In 1919 an International Union of Geodesy and Geophysics was formed. See Ordnance Survey.

**Geodetic Construction.** Form of aircraft construction patented by B. N. Wallis, and applied to several outstanding products of Vickers-Armstrongs, Ltd. The term is derived from the same root as geodesy (*v.s.*), a geodetic line being the shortest distance between two points on a curved surface. Geodetic panels used for the basic structure of the wings, fuselage, and tail unit of the Wellington, used in the Second Great War, and the record-breaking Wellesley of 1938, consisted of curved light alloy strips forming a basket-like web. This itself dictated the shape of



Gentleman-at-Arms. Dress of officer in the corps

the wings, etc.; no secondary structure was necessary. Even when covered with fabric, geodetic men's ladders saved up to 40 p.c. in weight over normal forms of metal construction, and proved very robust under operational conditions.

**Geoffrey of Anjou**, COUNT (1113–51). The founder of the Plantagenet house, he was born Aug. 24, 1113, and in 1129 married Matilda, daughter of Henry I of England, who bore him a son, later Henry II. The surname Plantagenet (*q.v.*) derives from the plant *genêt* (broom), of which Geoffrey always wore a sprig in his cap. He died Sept. 7, 1151.

**Geoffrey of Monmouth** (c. 1100–54). English chronicler and creator of the Arthurian legend. He was archdeacon of Llandaff c. 1140, and bishop of St. Asaph in

1152. His great work, *Historia Regum Britanniae* or *Historia Britonum*, professedly translated from the Celtic, was completed c. 1147. A legendary history of the British people, it was based on the stories of Nennius and on ancient lore. Geoffrey is credited with a *Life of Merlin*, in Latin verse.

**Geographical Society**, ROYAL. Society for the promotion of exploration and scientific geographical research and the improvement of geographical teaching in universities and schools. Formed in 1830, it has a house at Lowther Lodge, Kensington Gore, S.W., where its meetings are held. The map room and museum at Lowther Lodge are open to the public. The *Geographical Journal*, the organ of the society, is published quarterly.

## GEOGRAPHY AND ITS DEVELOPMENT

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*This general article on Geography, and the way it developed as a science during the 19th and 20th centuries, is supplemented by articles on geographical phenomena, e.g. Glacier; Mountain; and on allied subjects, e.g. Geology; Maps and Map-making*

Geography may be defined simply as the description of the earth's surface, and in this sense it ranks as one of the oldest forms of writing. The Ancients, such as Herodotus, described the world as they knew it in their day. Yet geography as a scientific study in the general field of education, seeking to classify and explain phenomena on the earth's surface, is among the youngest of the sciences. The first teachers of geography of this kind did not appear in the British universities until 1880, and as late as 1918 there were but two professors of geography in the U.K.

This late development of geography as a science is clearly due to the fact that the systematic study of the earth could develop only after the world had been thoroughly explored and all the relevant information concerning its surface features, its climates, its natural vegetation, and its human societies collected. The necessary facts about world geography were, therefore, not available before the early 19th century, and to two great German geographers who lived at this time must be credited the beginnings of modern geography. Their names were Alexander von Humboldt and Karl Ritter. They marshalled the material then available into an organized body of knowledge.

It is important to note that from ancient times there was a dual

interest. Some geographers, like Ptolemy, were interested in physical geography, that is, the nature and shape of the earth, its motions, its climates, and its natural vegetation cover. Others, like Strabo, were more interested in the people who dwelt on the earth's surface, in their number and ways of life. Such geographers are described as human geographers. Humboldt was primarily a physical geographer, and his contemporary Ritter was interested in human geography. Thus the subject has maintained this dualism in content from the earliest times, and continues to do so.

In the period that followed the work of Humboldt and Ritter, geographers evolved a new concept—that of the region. In brief, it may be said to be the combination of physical and human geography into one study, regional geography. The regional geographer assumes that the earth comprises a series of definite regions, and tries to analyse the component characteristics of each region in order to build up a composite picture. The standard illustrative region is the area bordering the Mediterranean Sea, which has warm, wet winters, and hot, dry summers, a characteristic natural vegetation, and cultivated crops of a definite type.

During the centuries of exploration, geographers were also concerned with the earth as a whole,

and with the physical forces which influenced men's lives. They were interested in the physical sciences of astronomy, geology, and biology. Since the development of these sciences gave new knowledge of aspects of the universe, geographers used this knowledge as a basis for the explanation of many of the observed facts of the earth's surface. From astronomy they borrowed facts about the earth as a planet to explain the consequences for man of the daily march of the sun in the sky or the rhythmic swing of the tides in the oceans. From geology they borrowed facts about the continents that preceded those now in existence, so as to explain the continuous process of deposition, elevation, and erosion that went on in geological time; processes which were responsible for the great mountain ranges whose remnants exist today. Likewise, the subject matter of meteorology became climatology for the geographer who wished to understand the circulation of the atmosphere in order to appreciate the movements of the air-masses, winds, and rainstorms over the surface of the earth. The conclusions of the biologists helped the geographer to understand the relationship between plants and animals and the earth's surface.

### Some Branches of Geography

There are other studies too, like the study of soils, wherein the contribution of geologists and climatologists is equally important. Physical geography today includes, in addition to such sub-headings as mathematical geography (involving the study of all that follows from the world's position in space, and the various processes by which men map and measure its surface), a study of geomorphology, or the examination of the surface configuration of the globe whether on a continental or on a regional basis. Mathematical geography, geomorphology, together with the study of climate, soils, and natural vegetation, therefore, comprise the general field of physical geography.

In the same way as the geographer has always been interested in the physical sciences so has he also been concerned with advances in the human sciences—ethnology, history, sociology, and economics. With the help of the historian he can recreate, in part at least, past landscapes, and thereby proceed to study man's relationship to his past physical and cultural environment. This is called historical geography. Ethnology and sociology, together with cultural anthro-

pology, deal with the origins and nature of society. Man is a social animal and in studying his groupings over the earth's surface the geographer has to call in the aid of the ethnologist and social anthropologist. The social geographer is not content to study only the groupings of people in terms of the distribution of population, but is also interested in the grouping of man's habitations on the earth's surface—the study of the settlement pattern and all that is involved in urban geography. The distribution of languages and religions also comes within his purview. Anthropogeography is the term sometimes used for this social geography.

With the progressive adaptation of man to his physical environment and the development of his technological skill has come the exploitation of the earth and its natural resources. The distribution of raw materials such as timber, coal, oil, and iron ore is the vital concern of the economic geographer, as are the areas where crops such as cotton, wheat, barley, and rice can be cultivated on a large scale. The economic geographer is also concerned with the chief areas from which are obtained the world's supplies of wool and meat and

and shape, together with the nature of their frontiers. Human geography, therefore, includes historical geography, social geography, economic geography, and political geography, all of which overlap.

Some geographers argue that the Greeks were the first to use the regional concept, in that they divided the world into zones based on temperature. There were the tropics that were winterless; the polar areas that were summerless, and the intermediate or temperate areas that shared seasonally the characteristics of both. If this (and amplifications thereof) be considered as the genesis of the regional concept, then the region has been rediscovered by modern geographers. Among the pioneers in this field must be included Frederic Le Play and Patrick Geddes, and possibly, above all others, the great French geographer Paul Vidal de la Blache.

So conscious was Vidal de la Blache of regional differentiations on the earth's surface that he spoke of regions as having a character and personality of their own. The concept was entirely impressionistic, subjective, and descriptive. There were no precise criteria on which these regions

were to be mapped. They possessed no exact boundaries in the field. The French geographers felt that there was such a region as the Mediterranean lands, and they then proceeded to analyse the physical-human relations within it and show how they interlocked. In the end it was always demonstrated that these regions were entities of themselves with a character of their own. They were buildings and not merely heaps of bricks. In England, Wessex, for example, can be recognized as a region in this sense. Some of Thomas Hardy's novels show how the form of the land, its surface geology and natural vegetation are closely reflected in the lives of his characters, yet no geographer can map precisely the geographical limits of Wessex, and no two regional criteria would yield precisely similar limits in S.W. England.

Some geographers, therefore, have retreated from the concept of geographical regions of the Wessex or French type (wherein both physical and human geography contribute to the formation of the regional character) and have stressed the importance of natural regions instead. Natural is defined so as to include all that



Geography. Air photography is used increasingly to assist the geographer. This picture shows more clearly than would a relief map the dissection of the landscape by fluvial erosion; while the residual erosion surfaces help an understanding of the underlying geological structure

H.C.A.F.

the world is divided into states, political frontiers produce complications. The political geographer seeks to determine the relation of the several states to their natural endowment, and attempts to explain their size



falls within the physical endowment of the area: structure, relief, climate, soils, and natural vegetation. Nevertheless, no exponent of the natural region has been able to demonstrate an example wherein there is absolute conformity in distribution between the various elements of physical geography that are supposed to make up the region. No isohyet ever follows a selected contour, and no species of vegetation is confined absolutely to the limits of a selected isotherm, isohyet, contour line, or rock exposure. Even the natural region as here defined cannot be in any sense a scientific concept.

The tendency therefore is for geographers to base regional limits on precise data appertaining to one clearly defined aspect of geography. For example, it is possible to delimit an agricultural region in terms of agricultural data specifically stated, *e.g.* a region where there are more than 500 sheep per acre or where there are 100 acres of arable land per square mile. In this way, too, climatic, economic, physiographical, vegetation, regions can be defined.

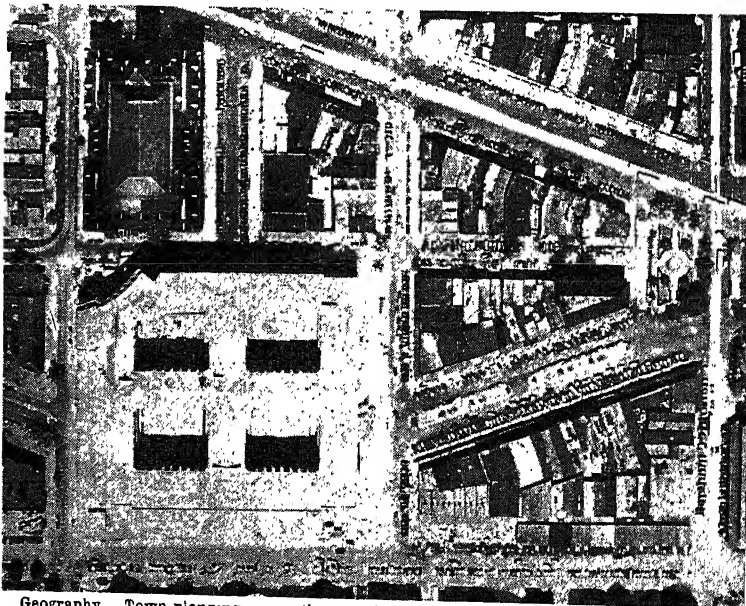
Geography, however, is not a purely academic study. Each person is concerned with his own or other people's environment. The practical aim of geography is to present an ordered conspectus of man's life and work in the con-

temporary world in relation to the physical background. The specialist student can attempt this for past phases of human history as well. The study of geography provides the most satisfactory manner of equipping the young citizen with a broad outlook, and a sense of perspective and proportion as far as man, and his environment the world over, are concerned. Few subjects can provide such a wealth of background to a general education, especially in days when each citizen requires a thorough knowledge of the world and its peoples so that he or she can take an intelligent interest in international affairs. The rapid development of communications, especially of air transport, has made the possession of a global geographical background essential. Islets of the Pacific, formerly existing in idyllic isolation, have become busy junctions on long distance air routes. Mountain passes and great oceans cease to be barriers to rapid transit. In South America, for instance, journeys between the west and the east, formerly a matter of days by sea, or by a difficult land passage across some high pass of the Andes, can now be made in a matter of hours by air; and the continent of Australia has been brought within a few days', instead of six weeks', distance from London.

Air photography, also, has introduced a new conception of cartography. In the past it was an extremely long and laborious operation to map extensive areas of almost impassable tropical forest or arctic swamp. This can now be done in a few days by taking a series of overlapping air photographs. After the photographs have been studied carefully in the drawing office, they can be converted into topographic maps of amazing accuracy. It is possible to distinguish the various types of trees and even cultivated crops from air photographs, thereby giving the cartographer the additional map material he requires. The whole world is known, in the sense that it has all been discovered; but large areas remain to be surveyed fully and properly mapped. Even countries possessing an excellent series of topographic maps can increase, by more intensive study, precise knowledge of their relief, climatic, zoological, and botanical condition. Such intensive work makes it possible for a new type of explorer to organize the lands discovered by the old explorers on lines most favourable for the development of a particular region.

One example must suffice. Certain food crops and fibres required in industry develop best under certain optimum conditions of temperature, rainfall, and humidity.

When precise climatological data are available in new lands, the geographer can provide what are called climatic analogues—that is, he can work out areas where climatic conditions are precisely similar. The most appropriate areas for development of a selected crop can then be defined, thereby helping to secure the economic prosperity of the regions concerned. In populated lands, the geographer supplies data of an entirely different character that are of the utmost importance in planning new towns and cities, and in determining the most suitable sites for new industries. Geography in this way offers a creative, as well as a descriptive and analytical, approach to the world and its problems.



Geography. Town planning, a practical application of geography, is greatly helped by low altitude aerial photographs such as this; they give information on the lay-out of streets, density of buildings, etc., that would take a long time to assemble on the ground  
Eastman Kodak Co.

**Geoid.** Term invented to describe the shape of the earth. Like the other planets, the earth is spherical, but not a true sphere. The bulge of the earth which makes its equatorial diameter longer than that through the poles causes the earth to be classed as a spheroid, while minor irregularities have led to the use of the term geoid, which is equivalent to saying that the earth is shaped like itself and like nothing else. *See* Earth.

**Geological Society of London.** Learned society, the oldest geological society in the world. Founded in 1807 and incorporated by royal charter in 1825, it began as a dining club, meeting at the Freemasons' Tavern, Great Queen St., London, W.C. Rooms were afterwards engaged at Garden Court (Temple), Lincoln's Inn Fields, Bedford St. (Covent Garden), until, in 1828, apartments were granted at Somerset House, Strand. In 1874 the society removed to its present quarters at Burlington House, Piccadilly, W.

The society maintained a valuable museum of rocks, minerals, and fossils until 1911, when the collections were dispersed owing to the growth of the library. British collections were then presented to the Museum of Practical Geology and collections from abroad to the British Museum of Natural History. The society meets monthly from Oct. to July. Its publications include the society's Quarterly Journal and Proceedings. Two series of its valuable quarto Transactions were published between 1811 and 1856, but none has been issued since. Most countries have geological societies with similar aims established later.

**Geological Survey of Great Britain.** The Geological Survey of Great Britain and the Museum of Practical Geology form a branch of the dept. of Scientific and Industrial Research. The Geological Survey was inaugurated in 1835 as a part of the Ordnance Survey; the Museum of Practical Geology was constituted later to house collections made by the Geological Survey and to demonstrate the economic applications of geology. The joint institution, formerly housed in Jernyn Street, now occupies a building in Exhibition Road, S. Kensington, opened 1935. There are a Scottish office in Edinburgh, and district offices in Manchester and Newcastle-upon-Tyne. The staff includes over 60 geologists.

The principal function of the Geological Survey is to prepare

maps showing the nature and distribution of ~~subsoils~~ rocks, and minerals in Great Britain. All available data from surface inspection, and from excavations, mines, and borings, are recorded and correlated; Acts of parliament make it obligatory to notify the Geological Survey before deep boring for minerals or water is begun. Maps on scales from 6 ins. to the m. to 25 m. to the in. are published, as are the survey's descriptive memoirs by H.M. Stationery Office. Virtually the whole country has been surveyed on the inch to the mile scale. Special attention is given to coal-fields, areas containing minerals.

and the distribution of underground water resources.

Exhibits in the museum illustrate the processes of physical geology, the regional and economic geology of Great Britain, and the economic mineralogy of the world. They include illuminated dioramas, relief models, maps, photographs, and specimens, a unique rotating relief globe 6 ft. in diameter, showing the geology of the world, and a collection of precious stones. The galleries and library are open to the public without charge. There is special accommodation for visiting research workers. Lectures are arranged for the public.

## GEOLOGY: STUDY OF EARTH'S FABRIC

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*Here is an outline of the growth of Geology, and of its application to the study of the earth's age and prehistory, and to practical problems of mining and engineering. See also articles on Cambrian System; Devonian; Fossil; Volcano, etc., and on the cognate subjects of Geography; Geophysics; Mineralogy; Oceanography; Petrology*

Geology (Gr. *gē*, the earth, *logos*, a discourse) is primarily the scientific study of the rock structure of the earth, its history, the processes by which the past and present features of the earth have been formed, the evolution of animal and plant life, as shown by fossils and their relationships to existing forms, and the development of the earth's natural resources for the benefit of mankind.

Geology as at present understood dates from the publication in 1795 by James Hutton of *A Theory of the Earth, with Proofs and Illustrations*, a work which attracted little attention until John Playfair produced in 1805 *Illustrations of the Huttonian Theory*, which was much clearer and more readable than Hutton's original work. Before this time, though much was known about fossils and minerals, geological theories were rarely based on observed facts, and were in many respects limited by Biblical history and the idea of a universal Noachian deluge.

With Hutton's and Playfair's sound work to build on, geology rapidly developed as a science. It received added impetus from Sir Charles Lyell's *Principles of Geology*, 1830-33, and from the stratigraphical work of William Smith, father of British geology, who worked out the general succession of the sedimentary rocks of Great Britain, correlating them by their fossils, and in 1815 published the first coloured geological map of England.

William Smith's work on the mapping of Great Britain has been continued and amplified by the Geological Survey of Great Britain (*v.i.*), founded in 1835 with Sir H. T. De la Beche as its first director. The survey gives priority to economic geology, *i.e.* to investigation relating to coal, iron, water supply, etc.—and to areas of scientific importance. The countries of the British Commonwealth, as well as most other countries, maintain their own geological surveys, the work of which has led in many cases to the active development of mining and other industries.

Departments of geology now exist at all universities, and apart from honours courses in geology itself, it is often taken as a subsidiary subject. It is a subject in the examination for association in the Institution of Civil Engineers.

Numerous geological societies read, discuss, and publish papers. The International Geological Congress meets once every three years in different countries. The Geological Society of London has rooms in Burlington House, Piccadilly, W.1, and publishes a quarterly journal. The Geologists' Association, with branches in the provinces, holds regular monthly meetings, conducts field excursions, and publishes the results of original work in its proceedings; and in many parts of Great Britain there are local geological societies and publications. The Geological Magazine contains numerous articles on British and foreign geology.

**HISTORICAL GEOLOGY OR STRATIGRAPHY.** This is the study of the history of the earth as shown by the rocks, their age relationships as observed in the field, and by the fossils they contain. (The detailed investigation of fossils is Palaeontology, *q.v.*) By accurate identification of the fossils in a rock, its geological age can be determined. Hence by consideration of the character of the rocks, their distribution, and the fossils in them, it is possible to delimit the land and sea areas of bygone ages, and to deduce their climatic conditions, a study known as Palaeogeography (*q.v.*).

#### The Solar System

The origin of the earth is bound up with that of the whole solar system. Early philosophers put forward numerous untenable hypotheses. The theory of Laplace (1796), that the solar system has consolidated from a rotating spiral nebula, obtained almost universal acceptance, until the publication in 1904 of the "planetismal hypothesis" by Chamberlain and Moulton. In this it was suggested that the earth grew by the coalescing of meteorites in space. These were considered to have been derived from the sun by the wrenching away of a portion of its surface during strong tidal movements created by the sun's passage close to another larger star. The meteorites were thus considered to be condensed and solidified fragments of the detached gaseous mass. On collision they would combine and grow into larger bodies, which in turn would unite and so steadily increase in size. In the earlier stages the mass was believed to have been molten from the heat of impact, when the heavier metallic material in the melt would sink inwards and form the earth's heavy core or barysphere. Lighter material would tend to float or be concentrated upwards, forming the rocky crust or lithosphere, in which geologists are interested. This in turn would be covered by still lighter material—water, which forms the hydrosphere, and air, which forms the atmosphere.

More recently Jeans and Jeffreys have enlarged and modified this hypothesis, and have produced the "tidal theory," by which the planets were formed directly from the cooling of a detached portion of the sun's surface, without the intermediate meteorite stage. In many ways the tidal theory was considered more satisfactory.

The state of the original earth crust is purely speculative; but

the accepted theory is that it must have been a thin shell constantly broken by volcanic eruptions and dragged apart by sub-crustal convection currents in the underlying molten interior. As it cooled and thickened, it became more stable, and water began to collect on it. Streams and rivers then began to flow, and to erode the surface unprotected by vegetation, the detritus they carried being deposited in hollows to form the first sedimentary rocks. Gradually the earth's surface assumed the general character it now has; but it was devoid of life until primitive algae (sea-weeds), worms, jelly-fish, etc., began to develop. Not until the Cambrian period do truly identifiable fossils appear. In the Pre-Cambrian, which probably embraces three-quarters of the earth's geological history, such animals as did exist had not developed hard parts, *e.g.* shells of lime or of horny substance called chitin, and consequently left no evidence of their existence. The fossils of the Cambrian period, however, are of relatively highly developed creatures which must have had a long line of ancestors.

#### The Laws of Stratigraphy

The geological ages of rocks are determined by the relationships of the rocks to each other, and by the fossils found in them. To decide the age of unfossiliferous rocks or of rocks that have been highly metamorphosed or contorted is often very difficult. Age relationships of rocks are established by what are termed the laws of stratigraphy. These are:

##### (a) The Law of Superposition.

A bed or stratum which lies on another was laid down later than the lower one, and hence is younger. This is also true of lavas poured out on the earth's surface or sea bottom. Difficulties arise in application of this law in cases where the strata have been steeply tilted or even inverted by folding or thrust-faulting resulting from intense earth movements.

##### (b) The Law of Fossil Content.

The same species of fossils occur in rocks of similar age. Once a particular species has evolved and died out, it does not reappear. Some species were very short-lived, and the strata containing them can be dated with precision. Others persisted for a long time—even geologically speaking—and are little help in determining age.

(c) The Law of Intrusion Sequence. Igneous material on its way from depth in the earth towards the surface penetrates the

overlying strata. Rocks thus penetrated must therefore be older than the intrusion that cuts through them. Similarly the relative ages of intrusive masses can be determined by observing which cuts which. Often the more recent molten material has been chilled by, and has a fine grained selvage against, the pre-existing older mass. In some cases, however, the separation of the two may be very difficult.

#### Successive Groups of Strata

If there is no break between successive groups of strata and each bed lies directly on the next, the succession is said to be conformable. However, earth movements occurred frequently during geological time, and the rocks then in existence have been folded, tilted, and faulted, and raised above sea level. Erosion has then taken place and the beds have been worn down so that the edges of the strata have been exposed on the land surface. The older rocks will then terminate abruptly and at an angle to any later ones deposited on the surface of erosion, there is a break in the sequence, and the two groups are said to be in unconformable relationship to each other. The plane of junction separating the older deformed and eroded beds from the newer strata is termed the plane of unconformity. Such a plane indicates a marked break in the record over the area where it occurs.

Geological history is subdivided by such breaks, which were formed at times of mountain building movements, transgressions or retreats of the sea, or important climatic changes. Many of them are world wide and can be used in broad age correlations of strata over long distances. They are often accompanied by marked changes in the fauna of the rocks.

Geological time can be divided by means of these breaks in the sequence and the changes they wrought into four great divisions (eras or epochs). These in turn can similarly be sub-divided into periods or systems, which are named after the locality where they were first investigated, *e.g.* Cambrian from N. Wales, Permian from Perm in Russia, etc. The systems are again divided into sub-systems termed groups, series, or stages, which may have local names, or may be called after some marker fossil, in which case they are termed zones. A series may contain more than one zone.

These time divisions are not of equal length, nor do they repre-

sent the deposition of equal thicknesses of sediment. They form an entirely relative time-scale, made approximately absolute by investigation of uranium and other radio-active minerals occurring in the rocks. It is known that these radio-active elements break down through a succession of stages until they produce lead of a certain character. By accurate analysis of the uranium to lead ratios in the igneous rocks associated with the strata of which the geological age has already been determined, the corresponding absolute age in millions of years can be ascertained.

The accompanying table shows the geological time scale or stratigraphic column, with eras or epochs subdivided into periods, and the absolute time scale in millions of years. The time of important mountain building movements is also indicated, and notes on other geological phenomena associated with the periods are given in the last column.

Remains of early man begin to appear in deposits of Pleistocene age. Man-like apes are believed to have been in existence in Mid-Miocene times; but the earliest chipped flints so far recognized as being possibly of human workmanship are found in strata believed to be of Upper Pliocene age. Bones of true man were found at Piltown in Sussex in gravels of early Pleistocene age, and elsewhere in deposits of much the same period. *Homo sapiens* did not appear until well into Pleistocene times. The Upper Pliocene beds containing the chipped flints are considered to be about 600,000 years old.

**PHYSICAL GEOLOGY.** This is the study of the processes by which geological phenomena are brought about. It covers the manner in which erosion wears away the land, the movement of material so loosened to the sea and its deposition, the upheaval of rocks to form mountains, volcanic activity,

earthquakes; and it endeavours to explain the forces which bring these things about. Many of the processes of the past can be observed going on in the present, and this continuity of physical processes led to Lyell's theory of uniformitarianism—the present is the key to the past. In principle, this is probably true; but still unknown factors may modify the dictum. For instance, though the processes of erosion, earth movement, volcanism, etc., were probably similar through past geological time to those which can be seen at present, the rates at which they worked in the past cannot be estimated.

In the past there were undoubtedly long periods when the earth's crust was more stationary than it is at present; there were also others when it was undergoing large scale movements. When the crust was thinner, it is reasonable to suppose that volcanic activity was more violent and more

GEOLOGICAL TIME SCALE

TIME MIL. YEARS	ERA	PERIOD	MOUNTAIN BUILDING MOVEMENT	REMARKS
0	Quaternary	Recent or Holocene		
		Pleistocene		Ice Age. Early man
		Pliocene		
		Miocene	Main Alpine Folding	
50	Kainozoic (OR TERTIARY)	Oligocene		Volcanic Activity in N.W. Scotland and Ireland
		Eocene	Early Alpine Folding	Mammals become prevalent
100	Mesozoic (OR SECONDARY)	Cretaceous	Laramide in U.S.A.	Chalk of N.W. Europe
150		Jurassic		Age of reptiles and primitive birds
		Triassic		Desert conditions in Great Britain
200	Palaeozoic (OR PRIMARY)	Permian	Appalachian and Hercynian Foldings	Desert conditions in Great Britain
250		Carboniferous		Formation of coal in Great Britain, N.W. Europe, and U.S.A.
300		Devonian		Old Red Sandstone Age of Fishes
350		Silurian	Caledonian Folding	
400		Ordovician	Taconic in U.S.A.	Volcanic activity in Lake District and N. Wales
500	Pre-Cambrian	Cambrian		Fossils become common
		Torridonian Lewisian	Post-Lewisian	In N.W. Scotland
		Longmyndian Uriconian		In Shropshire
		Charnian	Post-Charnian	Charnwood Forest
		Mona Complex		In Anglesea
		Dairadian Series Moine Series		In Scotland, of disputed age, but probably Pre-Cambrian
2000				

NOTE: The rock-groups of Pre-Cambrian age occur in widely scattered areas throughout Great Britain. Their ages relative to each other are unknown.

wide-spread. While, therefore, the actual processes probably worked in much the same manner, it is likely that they did so at different rates and on a different scale.

Any part of the earth's surface which rises above the sea is immediately subjected to attack by atmospheric agencies and in time will be worn down. Rain falling on the rocks attacks them chemically by solution or reaction. Heating by day and cooling by night causes rock particles to expand and contract so that they become loose and fall. Freezing and thawing of water in the rocks has the same effect, and may cause the breaking off of large rock fragments. These accumulate at the foot of cliffs to form screes. Chemical decomposition of the rocks produces soil. The combined action of these various agencies is referred to as weathering.

#### Formation of Streams and Rivers

Erosion is the combination of weathering and the removal of the broken material by water, wind, or ice. That part of the rainfall which does not evaporate from the surface of the ground or percolate deeply into the rocks runs off the surface to form streams and rivers. This flowing water transports away the loose soil and broken rock fragments, so removing the protective blanket of weathered material from above the rocks, and thus permits the action of rock-breaking and decay to penetrate deeper. As streams flow they erode their banks and their beds by the transport of rock and sand which is being rolled, dragged (bottom carriage), or bounced (saltation) along by the water. Swirling currents carrying pebbles will drill pot-holes in the stream bed; river curves become undercut on the convex side, and in this way valleys are deepened and broadened. Rivers cannot erode their beds deeper than the sheet of water into which they flow, and this limit is known as the base level. The high ground between river valleys is, in most cases, purely an uneroded residual portion of the earth's crust which is slowly wasting away.

Because rocks have different compositions and hardnesses they have different resistances to erosion. In this way valleys often follow the strike directions of softer beds, shales, etc., and are bounded on either sides by escarpments (*q.v.*) of more resistant strata. With prolonged periods of time and a stationary base level all the high ground will be re-

duced in elevation to a low undulating surface across which sluggish rivers slowly meander. Such a surface is termed a peneplain (Latin *pene*—almost). Re-elevation of the land or sinking of base level would cause the rivers to resume a more rapid flow, and this would start the cycle over again with their cutting back into the old surface.

Ice, in the form of glaciers or ice-sheets, is also a powerful agent of erosion. Glaciers descending from high mountains carve deep U-shaped valleys which often have nearly vertical walls. As they melt, the loose rocks and rock-flour they carry is dumped as moraines and is carried away by streams. In Pleistocene times much of northern Europe, Asia, and America was covered by great ice-sheets. In Britain they extended approximately to a line from the Bristol Channel to Harwich. North of this line much of the country is covered by a veneer of boulder clay left behind as the ice melted. The rocks below have been smoothed and striated by the ice and the stones it contained. Erratic blocks of rock transported by the ice have been left scattered about, sometimes many scores of miles from their place of origin. Glaciers such as those at present existing in high mountains were obviously active in the areas of N. Wales, the Lake District, and Scotland, and much of the scenery there owes its origin to glacial erosion.

#### Sand Transported by Wind

In desert areas, wind is the dominant agent of transport. Sand can be moved great distances by the wind, and what is eroded from one area becomes piled up in another. Fine dust from the deserts gets carried high into the atmosphere, is transported in suspension in the air, and is finally deposited outside the desert area as loess. The loess deposits of China cover hundreds of square miles of country S. and S.E. of the Gobi Desert. The sand blasting action of wind-driven sand etches and erodes the rocks with which it comes in contact. Soft beds are picked out, joints and planes of weakness are enlarged, and the rock masses are often carved into the most fantastic shapes. Because the main volume of sand is transported on or a few feet above the ground surface the rock masses are under-cut and eventually fall.

Material eroded from the land by water, wind, or ice may be

deposited on land as *e.g.* sand dunes, moraines, or river terrace gravels. Such land deposits are said to be continental in origin. Most material, however, is washed down into the sea and is deposited on the continental shelves or in partially enclosed seas such as the Mediterranean, Hudson Bay, and the North Sea. This detritus, whether it be brought down by rivers, or derived by wave action from neighbouring shores, has for its source of origin pre-existing rocks, and is called terrigenous. With it may be associated deposits of chemical or of organic origin, such as certain limestones formed by precipitation, or deposits made up of shell fragments or coral reefs. These deposits laid down in the sea are marine deposits. In the past when the oceans spread over what are now low flat land areas, similar deposits to those accumulating in shallow water nowadays were laid down. Old shore lines (littoral deposits), with boulder and pebble beds grading to beach sands, are recognizable. Delta and estuarine deposits can be distinguished in the older strata, and all show affinities to present day sedimentation.

#### Evolution of a Mountain Range

In some areas the ancient deposits show pronounced local thickening. Such zones of thick deposits occur as elongated basins of sedimentation, having widths of 100 to 200 m., and lengths up to several thousands of miles. The deposits they contain are all recognizably of shallow water origin, so that the beds must have been laid down in a trough of which the bottom was subsiding at a rate approximately equal to that at which the sedimentary material was being washed in. Such areas of thick deposition are called geosynclines, and their formation is the first stage in the evolution of a mountain range. The Appalachian geosyncline in the U.S.A. contains a thickness of sediments of about 30,000 ft.

Geosynclines develop when there is downwarping of the earth's crust brought about by compressional forces of enormous magnitude. The geosynclinal phase lasts a long time, and several geological periods may be represented in the accumulated deposits. Some volcanic activity usually accompanies the downwarping of the trough, and ancient submarine lava flows are often interbedded with the sediments.

Eventually the combined effect of the downwarping and the weight of the sediments in the trough causes the crust beneath to yield to the compressional forces, and the sides of the geosyncline are crushed together. The soft recently formed deposits of the trough are squeezed out over its margins with the production of great recumbent folds and flat lying planes of thrusting. The folds and faults become steeper near the centre of the one-time trough, and the amount of movement seen may not be so intense. The beds are thus forced upwards and outwards, while the foundation of the geosyncline is driven downwards into the deeper levels of the earth. This develops not only visible elevation in the form of a mountain chain on the surface, but also a root below. The forming of a folded mountain system is almost always accompanied by volcanic activity. The process is probably going on in the E. Indies at present. In the cores of ancient, now denuded, ranges, large masses of granite have invaded the mountain roots, and have worked their way upwards by assimilating the original country rock or by wedging off large blocks of the overlying material. Granite intrusions are often elongated parallel to the trends of the fold belts, as in Brittany, and the W. coast of Canada. Associated with the intrusive rocks are veins and masses of many minerals.

#### Formation of Metamorphic Rocks

The rocks of the cores of mountain ranges tend to be highly altered or metamorphosed by the heat of the advancing granitic bodies, and by solutions which permeate the rocks from depth. The formation of these metamorphic rocks is one of the major problems of petrology. Near the margins of the ranges, or where folding has not been so intense, slates are often formed. Within the more central zones the intruded and permeated rocks are altered to schists and gneisses to such an extent that their original character may be almost obliterated; and in extreme cases they may be entirely recrystallised, that is converted by recrystallisation to a rock which has the appearance and composition of granite, without ever having passed through a molten phase.

Once a mountain range has become elevated, it is immediately attacked by erosion, and begins to be worn down. However, because the crustal material of the

earth is lighter than that which lies below the crust, the root of the range tends to rise. The removal of material from the exposed top of the range, by lightening the load, accentuates this tendency. This continues until the crust, where it bulged downwards to form a root below the range, has been more or less levelled off and equilibrium is restored. Because of this uprising of the range as a whole while erosion is active, the deep core of the fold system and its granites are now exposed along the sites of many ancient mountain chains which now form flat or gently undulating country.

#### Earth's Deep Zones

Erosion has exposed sections of the earth's crust in old folded belts and in areas of ancient Pre-Cambrian rocks; but what lies below the continental crusts or below the ocean depths cannot be discovered by direct observation. Detailed geophysical work, especially on the speed and behaviour of earthquake waves, combined with the study of volcanic rocks which have come up from below has, however, yielded fruitful results. It is now agreed that the crust of the continents, apart from a layer of sediments, is mainly composed of rock having the composition of granite or granodiorite, with a specific gravity of about 2.7, and a thickness of 10–15 km. or about 10 m. Below this superficial crust, the rock becomes heavier and is probably more in the nature of gabbro with a thickness of 20–30 km. (about 20 m.). Below these two layers, which are believed to be crystalline and solid, is a surface of discontinuity by which earthquake waves are refracted. Here the rock material seems to behave like basaltic glass, which is solid and brittle for a suddenly applied stress, but for a long applied stress yields like a viscous fluid and flows. This zone grades down into heavier material, possibly peridotite or eclogite (*q.v.*), which continues to the central core of the earth at a depth of about 3,000 km. (1,900 m.). The core is heavy and is probably composed of iron and nickel.

Below the oceans the light granitic layer is either very thin or is absent altogether. Consequently the heavy gabbroic layer must be thicker and, because it weighs more, the surface of the crust is lowered, and water has collected in the great depressions so formed. The continental masses

being lighter are similarly raised up, and the two great areas of the earth—continents and oceans—are balanced above a potentially fluid substratum.

This balancing of the crust is referred to as isostasy. If two adjacent and sufficiently large areas of the crust are not balanced, the lighter is expected to rise so as to permit inflow of heavier material below, while the heavier area, on the same principle, will sink. In the case of a newly formed mountain range of which the roots have been downfolded into the more basic and heavier substrata, there is a natural tendency for uplift. As already mentioned, it will continue and be accelerated by erosion until the root disappears by adjustment or melting and lateral flow beneath the crust.

The deeper layers of the crust are hot and may be above their normal melting point, but they are under such pressure from overlying material that their fluidity or even their actual melting is restrained. Should that pressure be released without fall in temperature, then the rock will melt and magma—molten rock containing dissolved gases—will be produced. Hence when cracks occur in the earth's crust, if they continue far enough, they will tap the deep-seated magma-producing layers, and the molten rock will rise upwards. Near the surface the magma will lose its gases and will form lava.

#### Evidence from Lava

Such cracks have occurred at various times, and extensive lava floods have been poured out on the surface with little or no explosive volcanic activity. Typical areas are the Hebrides, Iceland within historical times, the Deccan of India, and Patagonia. In all cases the lava has been olivine basalt, which supports the evidence for an underlying basaltic layer below the crust.

Modern volcanoes lying along a visible fracture zone in the crust are those of E. Africa, in the Rift Valleys. Volcanoes in the oceanic islands, *e.g.*, Hawaii, remote from the continents, emit lavas which are dominantly basaltic in character. Volcanoes active in land areas erupt lavas which are intermediate in composition between basaltic and granitic.

In all mining and many engineering problems, geology is important. The tracing of coal-seams and ore deposits which may be faulted and folded, and pre-



dicting how they will be lying ahead of the working face is essential in planning future development. The location of tin, gold, or platinum bearing gravels is a problem involving knowledge of the behaviour of rivers combined with the recognition of those rocks from which such minerals are derived. The summing up of the potentialities of a prospect, as to whether the lodes seen on the surface are of such a nature that they may reasonably be expected to continue in depth, is based on geological knowledge. Oil exploration is highly skilled geological work demanding an understanding of geological structures, stratigraphy, fossils, and often geophysical methods of investigation.

The engineer needs geology in the location of water, and in any deep foundation work that may have to be undertaken. Particularly is this so in the location of dam sites—there have been several catastrophic dam collapses because the geology of the foundations was not properly investigated. The location of road materials and building stones is another task in which the geologist can assist; and the thorough investigation of any area through which a tunnel of any magnitude is to be driven is now recognized as a geological problem.

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**Geometer Moth.** Group of moths whose caterpillars are often called loopers from their curious mode of progression. They have



Geometer Moth. Caterpillar of Brindled Beauty Moth

only two pairs of prolegs, placed close to the rear of the body, and walk by alternately drawing up the body into a loop and

then extending it. Many of these caterpillars when at rest look exactly like dry twigs. The word geometer is from Gr. *gōmetrēs*, a land-measurer, hence the name Geometridae for the family to which these insects belong. See Caterpillar.

### Geometrical Progression.

Series of numbers in which the ratio or multiplying factor between the successive terms is constant. Thus, 1, 2, 4, 8, 16 is a G.P. of five terms, and, as each term is twice the preceding one, the ratio is 2. Similarly, 1.05, 1.05<sup>2</sup>, 1.05<sup>3</sup> . . . 1.05<sup>12</sup> is a G.P. of 12 terms with a common ratio of 1.05. Generally a G.P. is of the form  $a, ar, ar^2, ar^3, \dots, ar^{n-1}$ ,  $a$  representing the first term,  $r$  the common ratio, and  $n$  the number of terms. The sum of such a G.P. is given by

$$S = a(r^n - 1)/(r - 1),$$

or if the ratio is less than 1,

$$S = a(1 - r^n)/(1 - r).$$

Thus, in 2, 6, 18, 54, the first term,  $a$ , is 2; the common ratio,  $r$  is 3; the number of terms,  $n$ , is 4.

The sum of the G.P. is  $\frac{2(3^4 - 1)}{3 - 1} = 80$ .

In the G.P., 1,  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ,  $\frac{1}{16}$ ,  $\frac{1}{32}$ , the first term is 1, the ratio is  $\frac{1}{2}$ , and the number of terms is 6:

hence the sum is

$$\frac{a(1 - r^n)}{1 - r} = \frac{1\{1 - (\frac{1}{2})^6\}}{1 - \frac{1}{2}} = \frac{1 - \frac{1}{64}}{\frac{1}{2}} = \frac{63}{32} = 1\frac{31}{32}.$$

Sometimes a G.P. with ratio less than 1 continues indefinitely. In this case

$$S = a + ar + ar^2 + ar^3 + \dots$$

$$rS = ar + ar^2 + ar^3 + \dots$$

Subtracting,

$$(1 - r)S = a$$

$$S = a/(1 - r).$$

Geometrical progression arises in applications of compound interest, such as annuities and mortgages, depreciation, etc., and examples of growth or shrinkage at a constant rate.

**Geometric Mean.** Term used to denote the middle or average value of two quantities considered in respect of a steady rate of change from one to the other. Thus the geometric mean of 2 and 18 is 6, for 6 is 3 times 2 and 18 is 3 times 6. In general the geometric mean of  $a$  and  $b$  is  $\sqrt{ab}$ . The geometric mean is more correctly used than the arithmetical average in many investigations, e.g. the mean of population at ten-yearly intervals.

## GEOMETRY: OLD AND NEW

T. A. A. Broadbent, Editor, *Mathematical Gazette*

*This outline of the development of the oldest of the sciences is supplemented by further information under Conic Sections; Coordinates; Fourth Dimension; Mensuration, etc. See also Descartes; Einstein; Euclid, etc., and articles on Algebra; Arithmetic; Trigonometry*

Geometry is the science of spatial relations. The name is derived from two Greek words (*gē*, the earth, and *metrein*, to measure), suggesting that geometry began with land-surveying and measurement. Greek tradition states that Thales brought the study of geometry to Greece from Egypt, but the Egyptian knowledge of geometrical facts and mensuration appears to have been unsystematic and particular. The ancient Sumerian (Babylonian) civilization had made similar progress.

The Greeks turned this Egyptian and Babylonian mensuration into a science, by seeking for general theorems which should embrace a multitude of particular cases, and by systematising such general theorems into a logical sequence, proceeding from stated definitions and axioms by strictly deductive reasoning. Thus while the Egyptians knew that if a triangle has sides of lengths 3, 4, and 5 units, the angle opposite the largest side is a right angle, the Greeks dis-

covered and proved the general theorem of Pythagoras, that if in a triangle ABC,  $AB^2 + BC^2 = CA^2$ , then the angle at B is a right angle, and conversely. They also set this theorem as a link in a logical chain of theorems concerning triangles.

The best as well as best-known text-book of Greek geometry was Euclid's Elements, written about 300 B.C. for the use of students at Alexandria. Beginning with definitions of the concepts used, axioms or "common notions" and permissible constructions (by ruler and compass), Euclid derives a sequence of geometrical results by strict logical inference from his definitions and axioms, so that whatever is not explicitly stated as an axiom must be proved. For example, he proves that any two sides of a triangle are together greater than the third, as a consequence of his definitions and axioms, so as to avoid making any further assumptions, however plausible. Euclid's logic has been

shown to be faulty in some places, and some of his methods have been improved; but his geometrical insight was deep, his logic keen.

Euclid's propositions are of two kinds, theorems and problems. A theorem is the deduction of a geometrical result from those previously established. A problem proposes some geometrical construction, such as to draw a perpendicular from a given point to a given line; the method is given, and its correctness demonstrated by a theoretical proof.

The first six books of the *Elements* deal with triangles and circles in one plane. The first two books deal with triangles, parallels, areas of triangles and parallelograms; Books III and IV with circles and their relations to triangles and polygons. Book V explains the theory of ratio and proportion, and Book VI applies this theory to similar figures (having the same shape but differing in size). Books VII–X are arithmetical; Books XI–XIII consider the geometry of figures in three-dimensional space.

#### Apollonius on Conics

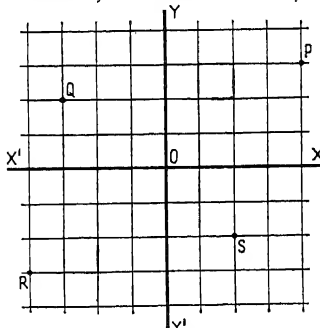
The Greeks paid great attention to curves other than the circle, particularly to the conic sections (ellipse, parabola, hyperbola). These curves are obtained by cutting an ordinary right circular cone by a plane. They can also be exhibited as the shadow of a circular disk on a plane surface. Apollonius (c. 200 B.C.) wrote the classic Greek treatise on conics, comparable in power with Euclid's *Elements*. The astronomical discoveries of the 16th and 17th centuries gave a fresh importance to conics. Kepler inferred from observations that the planets move round the sun in ellipses, and Newton showed that this empirical law is a mathematical consequence of his law of universal gravitation.

Archimedes, a little senior to Apollonius and perhaps the greatest Greek mathematician, devised geometrical methods which led towards the infinitesimal calculus of Newton and Leibnitz; he also applied geometry to physics.

In astronomical matters, the Greeks, probably following the Babylonians, dealt mostly with angular measurement. Although the Greeks were hampered by a lack of suitable symbolism for arithmetic and algebra, the beginnings of trigonometry can be seen in Greek geometry.

The development of algebra in the 16th century led to Descartes' fusion of algebra with geometry,

about 1640. If steps in a plane are counted positive to the N. and negative to the S., steps E. positive and steps W. negative, then the position of a point in the plane can be determined with respect to the N.-S. and E.-W. lines (called the axes of coordinates, OX, OY) by two numbers or "coordinates," namely the steps E. and N., in that order. Thus, in



the figure, P is fixed by its coordinates (4, 3), Q by (−3, 2), R by (−4, −3), S by (2, −2).

Generally, the position of a point can be fixed by its coordinates (x, y) where x and y are any two numbers, positive or negative, denoting the perpendicular distances of the point from OY and OX respectively.

Now, for instance, suppose that a point P is on a circle centre O and radius r. By Pythagoras's theorem,  $ON^2 + NP^2 = r^2$ , so that the coordinates of any point on this circle satisfy the equation  $x^2 + y^2 = r^2$ , and no other point in the plane will have coordinates satisfying this equation.

#### The Value of Coordinates

Descartes recognized that to each curve there will be a corresponding equation between the coordinates, such that each point on the curve has coordinates satisfying this equation, and no other point has coordinates which satisfy the equation, so that the equation characterises the curve; geometrical properties of the curve will correspond to algebraic properties of the equation, and *vice versa*. The method of algebraic geometry is therefore potent for the discovery of geometrical results by algebraic methods, and for the application of geometry to other branches of mathematics. The conic sections, e.g. can all be represented by equations of the general (second degree) form  $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$

where a, b, c, f, g, h are numerical constants whose values fix the

particular conic or class of conic. For example, the curve is an ellipse, parabola, or hyperbola according as  $h^2$  is less than, equal to, or greater than  $ab$ .

Cartesian methods extend to three dimensions, and curves and surfaces in space are more easily studied by coordinate methods than by purely Euclidean methods, partly because the geometrical representation of solid figures on a plane sheet of paper presents difficulties. Most advances in solid geometry have been made by coordinate methods.

#### Differential Geometry

The algebraic method is also the basis of the applications of the infinitesimal calculus to geometrical problems such as those concerning tangents to a curve, area bounded by a curve, length of a curve, curvature of curves and surfaces. From this has developed the subject of differential geometry, with its recent applications to n-dimensional space, to non-Euclidean spaces, and to the theory of relativity. A second advance made in the 17th century was the beginning of projective geometry, due to Desargues, though the extensive development of this branch did not take place till the early part of the 19th century.

Imagine a point-source of light, and a plane sheet of glass on which a diagram is drawn. The shadow of this diagram can be cast on a second plane, producing there a diagram which is called the "projection" of the former. By altering the relative positions of the source of light and the two planes, the original figure will give rise to a great variety of projected figures, because of distortion of lengths and angles. But certain properties of the figure will remain as properties of the projection: straight lines will project into straight lines, two curves intersecting at a point P will project into curves intersecting at the projection of P, and so on. This projection may be used (a) to derive from a simple figure properties of a more complicated projection; (b) to recognize a large variety of apparently different theorems as projective instances of one general theorem. For example, it can be shown that the projection of a circle is always a conic: hence (i) certain properties of the circle can be extended to conics by projection, (ii) a large number of separate properties of the ellipse, parabola, and hyperbola can be classified as projective cases of one single result.

Orthogonal projection can be regarded as a limiting case of general projection, but is a study of importance for its own sake, since it is the basis of practical geometrical drawing and of the applications of geometry to *e.g.* engineering and architecture (plan and elevation). Given a point P, let PM be the perpendicular from P to a fixed plane; then M is the orthogonal projection of P, and a figure described by P will give rise to a figure described by M. Thus the orthogonal projection of a circle is an ellipse, which is another way of stating that if an ordinary right circular cylinder (whose cross-section is therefore a circle) is cut obliquely by a plane, the section is an ellipse.

#### Non-Euclidean Geometry

In Greek times, geometry was regarded as a mathematical study of the "real" space of the physical universe, the axioms or "common notions" being obvious truths. The parallel postulate of Euclid, concerning the angles made by a transversal with a pair of parallel lines, effectively a definition of parallelism, could hardly be regarded as an obvious truth, and many attempts were made to deduce it from the other axioms. These attempts were bound to fail, since it is now known that the parallel postulate is not a logical consequence of the other axioms; Euclid's postulate amounts to saying that through a given point only one parallel to a given line can be drawn, but it is possible to construct logically perfect systems of geometry in which two parallels or no parallel can be so drawn. The first such systems were devised by Lobachevsky and Bolyai in the early 19th century, and have led to a view of geometry different from that taken by the Greeks. Modern geometry is a logical system of inference from a set of indefinable entities by means of axioms of relation between these entities, and is thus an entirely abstract science. It may happen that phenomena in the material world appear to correspond to the entities and axioms of geometry, and so the geometrical inferences can be applied to these phenomena; it is then a problem of importance to discover a geometry which appears best to fit the physical facts. Euclidean geometry adequately describes space on a small scale; but on an astronomical scale non-Euclidean geometry may give a better description. Such questions

have played a prominent part in the development of the theory of relativity. Here also the purely mathematical concept of a space of more than three dimensions has been of great value. While human physical perceptions extend only to a three-dimensional space, it is possible to construct an abstract geometry for space of any number of dimensions, on the basis of fundamental indefinables and axioms about their relations. Hilbert has defined a space in which the number of dimensions is infinite.

#### Later Developments

Other 19th century developments include: line geometry, due to Cayley and Plücker, in which lines and systems of lines are regarded as the fundamental concepts, rather than points and systems of points; geometrical transformations, studied particularly by the Italian geometers; Klein's unification of Euclidean and non-Euclidean geometries through projective ideas, and his assimilation of geometry with the theory of groups.

The vector and tensor analysis which is extensively used in relativity theory is derived partly from Hamilton's quaternions and Grassmann's *Ausdehnungslehre*, where a theory of vectors is given, a vector being essentially a straight line of given length and direction, and partly from the work of Riemann, Christoffel, and Ricci, which is fundamentally a study of the theorem of Pythagoras generalised to *n*-dimensional space and of curvature in such a space.

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**Geomorphology** (Gr. *gē*, earth; *morphē*, shape). Study of the shape of the earth's surface. In its widest sense it includes the problem of the shape and arrangement of continents and oceans, as well as the investigation of present-day land forms, mountains, valleys, coasts, etc., produced by earth movements or carved by erosion. Geology deals with the history of

such land forms; geomorphology is concerned with their present configuration. *Consult* Geomorphology: An Introduction to the Study of Landscape, C. A. Cotton, 1939.

#### Geophagy OR EARTH EATING.

Widely spread custom of eating various forms of edible earth. Its purpose may be dietetic, medicinal, or sacramental. In New Caledonia, cakes of iron-manganese earth are eaten after copious meals; in New Guinea, soapstone is preferred. The Dyaks of Borneo eat a mixture of red ochre and an oily clay; the Hopi Indians of N. America eat clay mixed with potato.

**Geophilus** (Gr. *gē*, earth; *philos*, loving). Genus of blind centipedes which live under ground, whence their name of earth-loving. They prey mainly upon worms, which they attack in their burrows and on the ground.

**Geophysics.** Collective name given to the branches of physical science which are concerned with the earth and its atmosphere. Meteorology, seismology, atmospheric electricity, and terrestrial magnetism are thus geophysical subjects. Geology and geography, which chiefly describe the structure of the earth rather than account for natural processes, are not regarded as coming within the range of geophysics, although there is overlapping to a limited extent. *See* Geodesy.

**Geopolitics.** German political doctrine which explains political tendencies and developments by the influences of geography. It maintains that the policy of every nation is determined by its geographical position, and the necessities imposed on it by space prove more effective than ethical or ideological factors.

#### Geopotential. Term in physics.

A body is said to acquire potential energy when its position is changed in a field of force, *e.g.* when a mass is raised through a vertical distance against gravity. When considering matter under the influence of the gravitational field of the earth, geopotential is the term applied to the potential energy of unit mass, the zero of potential referring to sea level. The force of gravity, however, is greatest at the poles and least at the equator; hence the higher the latitude the greater the energy needed to raise a body to a given altitude. In other words, the level at which a specified geopotential is reached becomes lower as one approaches the poles. In meteorology, the consideration of air movements is facilitated by expressing the posi-

tion of parts of the atmosphere in terms of geopotential rather than height. Results of balloon soundings are published internationally with reference to geopotential levels. *See* Energy.

**George, THE.** Part of the insignia of the Order of the Garter. It is an enamelled gold pendant, representing S. George slaying the dragon, and is suspended from the collar. There is a "lesser George" with the same device on an enamelled ground, surrounded by an oval garter. *See* Garter.

**George.** Lake of Africa. It is in the S.W. of the Uganda protectorate, forming a N.E. extension of Lake Edward, with which it is connected by a narrow channel.

**George.** Salt lake of New South Wales. It is 25 m. S.W. of Goulburn, and is an isolated basin with no outlet. Sometimes nearly dry, it measures usually 25 m. by 8 m.

**George.** Lake of New York, U.S.A. Situated in the E. part of the state, between Washington, Essex, and Warren cos., it stretches N.E. to S.W. for 35 m., and has a breadth varying from 1 m. to 3 m. Picturesquely located among the foothills of the Adirondacks, it is a shallow, clear-water lake, studded with small islands, and is drained by a stream into Lake Champlain.

**George** (Gr. *geōrgos*, husbandman). Masculine Christian name. Although that of the patron saint of England, it did not become popular there until after George I came to the throne. The German form is Georg and the French Georges. Georgina and Georgiana are feminine forms.

**George.** Patron saint of England. He is generally identified with George of Cappadocia, who was put to death by Diocletian, April 23, 303. The only historical fact is that he was martyred at Lydda. According to the Golden Legend, having slain a dragon, he put off his knightly habit, gave all he had to the poor, went forth to

preach Christianity, and was martyred in 287.

S. George first became recognized as England's patron saint under the Norman kings. In 1344 Edward III founded the Order of the Garter with S. George as its badge, and some years later Edward IV built the present magnificent S. George's Chapel at Windsor, where, in the reign of Henry V, the supposed heart of the saint was deposited as a precious relic. S. George is also the patron saint of Portugal and of Aragon. His festival is April 23.

**George I** (1660-1727). King of Great Britain and Ireland. Born at Hanover, March 28, 1660, he was the son of Ernest Augustus afterwards elector of Hanover, and was baptized George Louis. His mother was Sophia, a granddaughter of James I. In 1682 he married a cousin, Sophia Dorothea, but the union, partly owing to the prince's numerous infidelities, was unhappy, and in 1694 the princess was divorced. George served with his father's troops against the French, but much of his early life was given up to pleasures of the grosser kind. In 1698 he became elector of Hanover and in 1701 the Act of Settlement recognized his mother and then himself as heir to the throne of Great Britain. In 1707 he commanded an imperialist army in the War of the Spanish Succession, but resigned in 1710.

On Aug. 1, 1714, George succeeded Anne as king. Although neither popular nor instructed, he had a certain common sense, while his ignorance of English compelled him to leave much to his ministers. By accident or design, therefore, he may be described as a constitutional sovereign; his reign strengthened the power of the cabinet in British politics. As a European figure he was of much importance. The king died at Osnabrück, June 11, 1727, and was buried at Hanover. Of his mistresses the most prominent were the ladies created duchess of Kendal and countess of Darlington. There are Lives by L. Melville, 1908; J. F. Chance, 1909; Sir H. M. I. Terry, 1927.

**George II** (1683-1760). King of Great Britain and Ireland. The son of George I, he was born Nov. 10,

1683, at Herrenhausen, when his father was electoral prince of Hanover, and baptized George Augustus. His early life was passed in Hanover, and at the head of some Hanoverian troops he served against France in the War of the Spanish Succession.

The Act of Settlement of 1701 placed him in the succession to the throne of Great Britain, and in 1706 he was made duke of Cambridge, but a proposal that he should reside in England fell through. At Hanover he lived until 1714 the somewhat coarse life of a prince who was without either ambition or culture. In 1714 the prince followed his father to England, and for thirteen years he was prince of Wales. The relations between the two had been bad for some time, and in London they reached such a state that the prince was ordered to leave the court. He replied by setting up a court of his own, which became the centre of all opposition to George I and his ministers.

In 1727 George became king, and he reigned for 33 years. The reign may be divided into two parts, the break being the resignation of Walpole in 1742. In both he acted as a constitutional sovereign, realizing that there was a new power in the state—the will of the people. His own quarrels with his father were repeated in the case of himself and his son Frederick, who, driven from court, formed his own circle of opposition to the king and the ministry. He had the sense to heed the wise advice of his wife Caroline, but took several mistresses, both before and after her death. In addition to Frederick, George had a son, William Augustus, duke of Cumberland, and five daughters. He was the patron of Handel and the founder of the university of Göttingen. George died at Kensington Palace, Oct. 25, 1760. There are memoirs of the reign by H. Walpole, rev. ed. 1847; Lord Harvey, rev. ed. 1931; and a study of the king by R. J. Lucas, 1910.

**George III** (1738-1820). King of Great Britain and Ireland. The eldest son of Frederick, prince of Wales, he was born June 4, 1738, and was baptized as George William Frederick. His father died in 1751, and he was educated under the eyes



George I (II)  
After Zeeman



George I (I)  
After Kneller



S. George, the patron saint of England. From a medal by W. Wyon, R.A., 1851

of his mother, Augusta, a princess of Saxe-Coburg, and the earl of Bute, who became the head of his household in 1756. Their aim



*George III*

After Lawrence

was to make him a king of the older type, one who dominated domestic and foreign politics, rather than one of the constitutional type as was his grandfather, George II. In Oct., 1760, he became king.

George was the first ruler of his house who could claim to be a Briton born and bred. His reign began with an attempt to secure power for himself. The earl of Bute succeeded Pitt and Newcastle in 1761, but he left office in 1763, and it was evident that some other method or some other minister would have to be tried if the plan was to succeed. Other prime ministers, less pliable, followed, but by 1770 the king had formed his own party, the king's friends, and Lord North became premier. For twelve years George directed, through him, the affairs of the country, the period being marked by the War of American Independence. In 1780 the king's mind gave way, and a regency was necessary, but he soon recovered and was able to throw his influence into the prosecution of the war against France and to declare strongly against any concessions to the Roman Catholics. From time to time fresh attacks of insanity came on, and in 1811 he was finally incapacitated. He lingered, however, until Jan. 29, 1820, when he died at Windsor.

George was neither a wise nor a constitutional king, and a good deal of responsibility attaches to him for the misfortunes of the reign. His private life, on the other hand, was blameless, and in his later years his popularity was great. His homely ways inspired Gillray's affectionate caricatures of "Farmer George." In Charlotte, princess of Mecklenburg-Strelitz, he found a partner to whom he was ideally suited. His family consisted of nine sons and six daughters; the sons who grew to manhood being George IV, William IV, and the dukes of York, Kent, Cumberland, Sussex, and Cambridge. George's correspondence, ed. Sir J. Fortescue, was published 1927-37. *Consult* Life, J. D. G. Davies, 1936; Royal George, C. E. Vulliamy, 1937.

**George IV (1762-1830).** King of Great Britain and Ireland. The eldest son of George III, he was born in London, Aug. 12, 1762, and was baptized as George Augustus Frederick. A few days afterwards he was created prince of Wales. With considerable abilities, he was carefully educated, but he early entered on a life of extravagance that continued to the end.

The prince of Wales became prominent politically owing to the insanity of his father. In 1788 the country was agitated over the question of the regency. Should the prince, as Fox contended, become regent by right of birth and receive the kingly power without limitations, or should the office be conferred upon him subject to certain restrictions laid down by Parliament? The latter view, that of Pitt, prevailed, but George was then regent for only a short time. In 1811, however, the king's insanity returned and he became regent again, retaining the position until his accession in Jan., 1820.

As ruler of the country between 1811 and 1830, George IV was neither successful nor popular. He resisted reform as long as he could, for he was old and feeble when he consented to the measures that granted relief to Nonconformists and Roman Catholics.

The chief interest of the reign, from the popular point of view, was in the relations between the king and his wife, Caroline of Brunswick, whom he married in 1795. The two soon separated, but their discords were the subject of public inquiry in 1806 and of great public excitement when he became king. A bill to deprive the queen of her royal position was introduced, but it failed to pass, public sympathy being vociferously on the side of the lady.

George had a succession of mistresses—Mary Robinson, the actress, Lady Jersey, Lady Hertford, Lady Conyngham, and others. His most lasting union was with Mrs. Fitzherbert, who secretly became hismorganatic wife in 1785 and lived with him until 1813. His only legitimate child, the princess Charlotte, died in 1817, a year after her marriage with Leopold, prince of Saxe-Coburg. The king's

admirers called him the first gentleman of Europe, and his courtly behaviour and early good looks partly justified this; but the popular verdict was "a bad son, a bad husband, a bad father, a bad subject, a bad monarch, and a bad friend." The nation paid his gambling debts and financed his extravagance and debauchery; but George was a patron of those painters and writers he admired, and the creator of Brighton. He died at Windsor, June 26, 1830. Creevey, Croker, Greville, Holland, etc., left memoirs of his reign and character; *consult also* The First Gentleman of Europe, L. Melville, 1906; Life, R. Fulford, 1935.

**George V (1865-1936).** King of Great Britain, Ireland, and the British dominions beyond the seas, emperor of India. Born at Marlborough House, June 3, 1865, second son of the prince of Wales, afterwards Edward VII, he was christened George Frederick Ernest Albert. After private tuition together with his elder brother Albert Victor, later duke of Clarence, they both entered the navy, 1877, joining the Britannia at Dartmouth, and voyaged to the W. Indies in the Bacchante 1879-80, then sailed on a world cruise later in 1880, the first of a series of voyages which made George a more experienced traveller than any of his predecessors on the throne. He became a sub-lieut. on his 19th birthday, and was promoted lieutenant in 1885 after further training at Greenwich, where he obtained a 1st class in seamanship and gunnery. Appointed to command the gunboat Thrush, 1890, he sailed her to the W. Indies and back, being promoted to commander on his return.

In 1892 the sudden death of his brother placed George in direct succession to the throne, curtailing his naval career. Created duke of York, he married, July 6, 1893, Victoria Mary, only daughter of the duke of Teck, in the Chapel Royal, S. James's, and forthwith entered upon a succession of public duties in London and the provinces and in Ireland. With his father's accession to the throne early in 1901 those responsibilities increased. As duke of Cornwall and York he toured the British dominions with the duchess, leaving England in the Ophir, March 16, 1901, and returning Nov. 1. The chief purpose of the tour was to open the first federal parliament of Australia, May 9. On Nov. 9 he was created prince of Wales, and on Dec. 5 delivered a notable



*George IV*

After Lawrence

speech at Guildhall, London, the theme of which was "Wake up, England!" The prince and princess visited India, 1905-06, and Canada, 1908 (for the Quebec tercentenary).

Succeeding to the throne May 6, 1910, George was crowned June 22, 1911. Meanwhile, in Feb., 1911, an old and malicious rumour that he had contracted an earlymorganatic marriage in Malta was finally quashed in a successful action for criminal libel brought against E. F. Mylius, and in an authorized public denial from the king. In Nov., the king and queen sailed in the Medina to preside at a coronation durbar at Delhi, India, Dec. 12; there also he announced the transfer of the capital of India to Delhi and laid the foundation stones of New Delhi.

#### Events of his Reign

The chief political events in which he was concerned during his 25-year reign were the dispute over the house of lords in 1910-11; the controversy over Home Rule; the First Great War; and the economic crisis of 1931. At the very outset he was confronted by his duties as a constitutional monarch with the necessity for agreeing to the exercise of the royal prerogative in the creation of enough new peers to establish in the house of lords the will of an electoral majority respecting the powers of that house. (See Parliament Act.) In the event the prerogative did not need to be used. In July, 1914, at the height of the Home Rule crisis, when talk of civil war was to the fore, he took the initiative in summoning the opposing party leaders to a conference at Buckingham Palace, but the conference brought no solution. During the First Great War he visited his armies in France several times (in Oct., 1915, he was badly injured there by a fall from his horse); while at home the royal household set an example of behaviour to all classes, in particular the banning of all alcoholic drinks from royal establishments for the period of the war being widely copied. The king and queen were indefatigable in performing their round of war duties, especially in their visits to hospitals and munition factories. As for the politico-economic crisis of Aug., 1931, the king acted with impressive promptness in hastening from Balmoral to London to consult the various party leaders, and there is no doubt that his part in the establishment of an all-party national government was a very real one. Moreover, the consistent tact and

courtesy which marked his relations with the first Labour government did not pass unnoticed.

But his greatest achievement as king lay in the unwearying correctness of his demeanour as a constitutional monarch and his adherence to an ideal of personal service which created higher standards for the principle of constitutional monarchy. He remained especially mindful of the responsibility devolving upon him as the first sovereign to wear that symbolic crown which is the sole political link of the British Commonwealth.



George V making one of his four Christmas broadcasts to his peoples as "head of this great family"

A far more remarkable aspect of his kingship was the personal respect in which he came to be held in his own lifetime, a respect which deepened into a unique affection. His duties brought him into contact with all classes. The crowds learnt to applaud his quiet dignity on official occasions such as the annual ceremony at the Cenotaph, when he led his people in a simple act of homage; but they appreciated even more wholeheartedly his more informal appearances at the Cup Final, the Derby, the Wembley exhibition of 1924-25, and several royal command variety shows. The public was ready to share in the joys and sorrows of his family life—marriages of his children, bereavements, the birth of grandchildren—as with a friend.

During a long and serious illness, contracted at the end of Nov., 1928, and caused by a virulent abscess at the base of the lung, it is possible that his subjects throughout the Empire were somewhat surprised at the intensity of their own anxiety and their own subsequent relief when he was out of danger and able to be moved to Bognor (Feb., 1929) for convalescence. There is certainly no doubt that some six years later, on the

occasion of his Silver Jubilee, May 6, 1935, when the king and queen attended a thanksgiving service in St. Paul's cathedral, it was the king's turn to be surprised at, and moved by, the display of love and loyalty with which he was everywhere greeted. If one act of the king had contributed more than any other to the warmth of personal feeling which reached its climax on Jubilee day, it was the institution in 1932 of an annual Christmas afternoon broadcast, in which he interrupted his own private festivities for a few moments to speak from the quiet of his study at Sandringham House to all his peoples, as "head of this great family." No monarch before him had the opportunity to make his voice so familiar to all his people; no man could have better seized the opportunity to make that voice beloved.

#### The King's Last Illness

On Jan. 17, 1936, it was first announced from Sandringham that the king was ill and that bronchial catarrh had led to disquieting cardiac weakness. On Jan. 20, at 9.25 p.m., was issued the memorable message: The king's life is moving peacefully to its close. This was broadcast at 9.30 and thereafter repeated to a silent and waiting empire at quarter-hour intervals until midnight. The king died at 11.55 p.m. His body was moved to London, where it lay in state in Westminster Hall until Jan. 28, the day of the funeral. During the last hours his four sons mounted guard over the catafalque for a period. After a London procession the king was buried in St. George's chapel, Windsor.

King George was an enthusiastic philatelist, possessing a unique collection of British stamps. He was also at one time reckoned one of the six best shots in the country.

There were six children of his marriage: Edward (b. 1894), who succeeded him as Edward VIII (see Windsor, Duke of); Albert (b. 1895), later duke of York and King George VI (*q.v.*); Mary (*q.v.*, b. 1897), later countess of Harewood and princess royal; Henry (b. 1900), later duke of Gloucester (*q.v.*); George (1902-1942), later duke of Kent (*q.v.*); and John (1905-1919). In 1917, by royal decree, George V changed the name of the royal house from Saxe-Coburg to Windsor, and thereby became the first monarch of that house. Consult Lives, A. Bryant, 1936; J. Gore, 1941; H. Nicolson, 1952.

Gordon Stowell



## H.M. KING GEORGE VI

Beverley Baxter, Writer, Journalist, Politician

*This account deals mainly with the personal life of George VI who, called unexpectedly to the throne, fulfilled his task with marked success in a period of change and disruption unequalled in human experience. For political and military aspects of his reign, see entries under United Kingdom; the various Dominions; India, etc.; Second Great War, etc.; and biographies of outstanding personalities of the time*

Prince Albert Frederick Arthur George was born at York Cottage, Sandringham, Dec. 14, 1895, second son of the then duke and duchess of York, later to become King George V and Queen Mary. At the time of his birth he was fourth in succession to the British throne, then occupied by Victoria, his great-grandmother. With his elder brother, Prince Edward of York, later to become successively prince of Wales, Edward VIII, and duke of Windsor, Prince Albert received a general education

under private tuition, then entered the Naval Training College at Osborne in 1909, and in 1913 sailed in the Cumberland on an instructional cruise to the W. Indies, Canada, and Newfoundland. On his return he was gazetted midshipman in the Collingwood. He cruised with her in the Mediterranean, and was on board as she proceeded to her war station in Aug., 1914.

During the First Great War he suffered considerable ill-health from gastric trouble, and was

frequently in hospital. He was present and under fire at the battle of Jutland, 1916, and was mentioned in dispatches. But in Nov., 1917, the presence of a duodenal ulcer was revealed, necessitating an operation and an end to service afloat. In 1918, having served as a ground officer in the R.N.A.S., he was gazetted captain in the newly established R.A.F., serving on the staff of Sir John Salmond at Spa after the armistice. In Aug., 1919, he qualified as a pilot, and was promoted squadron leader and later wing commander, 1919.

From 1919 to 1920 he was a member of Trinity College, Cambridge, and attended lectures in the schools of history, economics, and civics, founding the basis of a permanent interest in and understanding of industrial problems. In June, 1920, he was created duke of York, earl of Inverness, and Baron Killarney, taking his seat in the house of Lords the same month. From this time he entered upon a succession of duties at home and abroad.

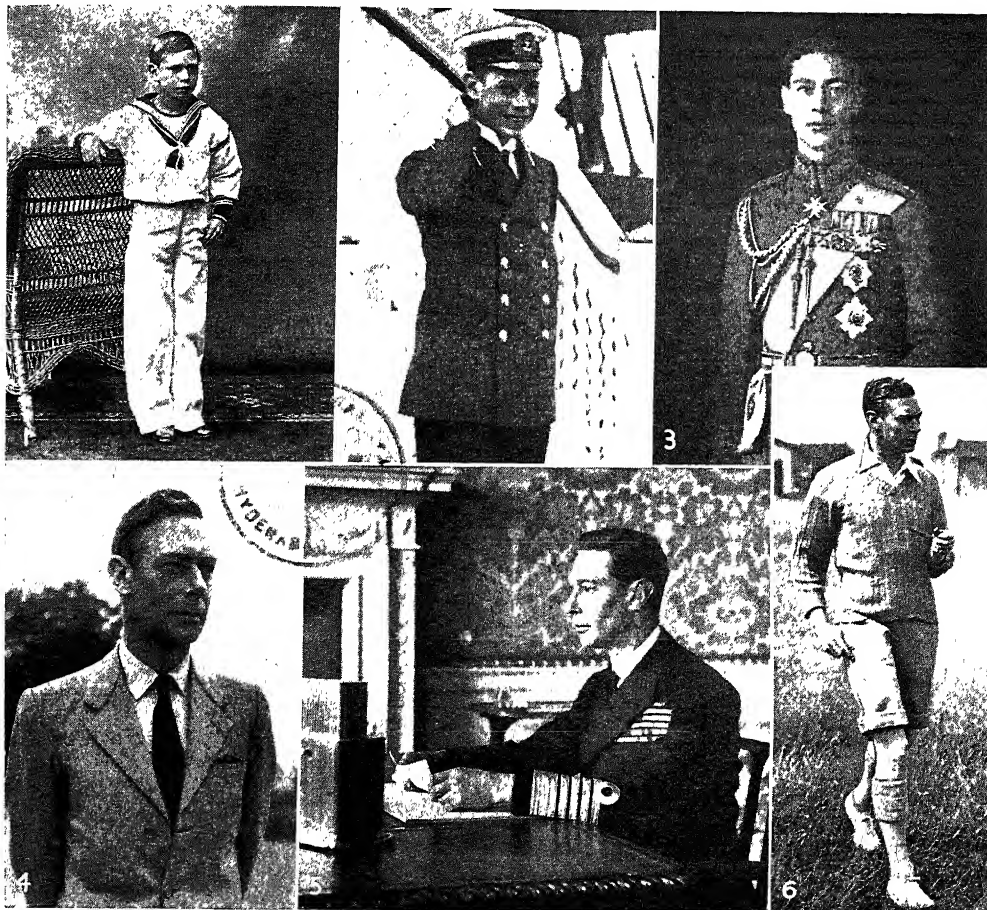
### Marriage and Tours Abroad

On April 26, 1923, the duke was married at Westminster Abbey amid scenes of enthusiasm to Lady Elizabeth Bowes-Lyon, youngest child of the earl and countess of Strathmore. They resided first at White Lodge, Richmond. In 1924-25 the duke and duchess made a prolonged tour of East Africa and the Sudan; then in Jan., 1927, they embarked on a great imperial mission, culminating in the opening of the new Australian federal parliament buildings at Canberra. They sailed in the Renown, visiting the West Indies, the Islands of the Caribbean Sea, and Fiji, and staying one month in New Zealand before continuing to Australia, where the new parliament buildings were formally opened May 9, 1927. The Renown brought the duke and duchess home in June and they took up residence at 145, Piccadilly, London.

Particular interests with which the duke of York identified himself at home included the Safety First movement, the British Empire Cancer Campaign, the Playing Fields Association, and the Industrial Welfare Society. Out of the last grew his scheme of the Duke of York's camp for public school and industrial boys, inaugurated at Dymchurch, Kent, in the summer of 1921 and later moved to Southwold. He became a regular attendant at this camp,



George VI. His Majesty the King in the uniform of an admiral of the fleet  
Photo, Yanduk



George VI. From childhood to sovereignty. 1. Aged 8 years. 2. Naval cadet, 1912. 3. At the time of his marriage, 1923. 4. On his 51st birthday. 5. At the microphone, Christmas, 1942. 6. "Great Chief" of the Duke of York's boys' camp

joining his young guests annually, whenever possible, in their camp meals, games, and sing-songs. He was also an enthusiastic freemason, being provincial grand master of Middlesex at the time of his accession. His last public appearance as duke of York was at his installation at Edinburgh as grand master mason of Scotland.

On the abdication of Edward VIII, Dec. 11, 1936, the duke succeeded to the throne as George VI. He was crowned in Westminster Abbey on May 12, 1937. His first state engagement was a visit to Belfast with the queen in July, 1937. They paid a state visit to France of four days' duration in July, 1938. But their most momentous visit was to Canada and the U.S.A., May 6-June 23, 1939. They sailed in the liner *Empress of Australia*, and toured across Canada to the Pacific, the king unveiling the

Canadian national war memorial at Ottawa en route. On the return journey they crossed into the U.S.A., June 7, and were cordially received at Washington by President Roosevelt. This was the first time a British monarch had set foot in the U.S.A., and the welcome was markedly cordial. The king and queen visited New York (and the World's Fair held there) on June 11.

#### During the Second Great War

Throughout the Second Great War, in addition to his arduous state duties, the king found time to visit many military camps, airfields, naval stations, and munitions factories. He visited the B.E.F. in France in Dec., 1939, and examined sectors of the Maginot line. In June, 1943, he spent a fortnight with the British and U.S. armies in N. Africa, and included a day in Malta. On June 16, 1944, ten days after

D-day, he visited Eisenhower's advance H.Q. in Normandy, travelled to the Italian front five weeks later, and spent a further six days with his armies in Belgium and the Netherlands in Oct.

Early in June, 1945, he visited the newly-liberated Channel Is., and on July 4 opened the N. Ireland parliament in Belfast for the first time. At Plymouth on Aug. 2 he met President Truman, then returning from the Berlin conference.

In Feb., 1947, the king and queen sailed with their two daughters in the *Vanguard* for a state tour of S. Africa and Rhodesia, during which he opened a session of the Union parliament at Cape Town. Throughout the visit the keynote was an emphasis on his position and authority as king of South Africa. The royal family returned to England on May 11.

Not even a courtier could say that King George's personality

had gripped the imagination of the British people as had that of his elder brother. By comparison he was little known. He had been content to be the younger son of his father, fulfilling such duties as were required of him at home and abroad without seeking or attracting the limelight.

He had faced life with a serious physical infirmity. He stammered so that even ordinary conversation could be an ordeal to him. For no discoverable reason certain consonants affected the nerve centres, resulting in a long and painful silence. At the age of 14 he determined to master his defect. He read aloud for hours until he could not endure the sound of his own voice. His conversation became almost normal but any public utterances set him back. By the time he came to the throne he had acquired a masculine baritone voice, of musical quality and almost devoid of hesitancy. In the same way, during his years of service in the navy he had to fight for health as he had fought against stammering, and again he won, achieving a capacity for great endurance.

#### Family Life

It was centuries since a prince of England in direct line of succession to the throne had been allowed to marry one of the king's subjects. That the duke chose wisely was demonstrated to the whole world. The family life of George VI became an inspiration to the nation in a period of shifting values. There were two children of the marriage, Elizabeth Alexandra Mary (b. 1926) and Margaret Rose (b. 1930). The silver wedding of the king and queen was celebrated in 1948 by their attendance at a special service at St. Paul's cathedral.

King George's coronation was one of the last great scenes of pageantry before the outbreak of the Second Great War. By that time the true character of the king had begun to make itself felt. The tour of the king and queen in Canada in the spring of 1939 evoked such enthusiasm that the queen spoke of it as their second coronation. The 1947 tour of S. Africa was a heartening demonstration of the continued strength of Commonwealth loyalty and solidarity.

In middle age the king had become well enough to carry out fully his exacting duties; the announcement, Nov. 23, 1948, of an indisposition so serious that a state visit to Australia and New

Zealand, projected for 1949, had to be indefinitely postponed, came therefore as a shock to the public. He was suffering from an arterial obstruction necessitating prolonged rest and eventually an operation. In 1951 he underwent a further serious operation, this time on the lung. He appeared to be recovering successfully, but died suddenly in his sleep, at Sandringham, Feb. 6, 1952, and was buried in St. George's Chapel, Windsor. He was succeeded by his daughter Elizabeth.

King George VI came to the throne when the country was in the shadows, and his reign was to see the most cruel war of all time, followed by social and political upheaval. Yet the institution of constitutional monarchy was not weakened but took on increased strength. The character of King George had much to do with this, for he had become a wise counsellor whose judgement and high sense of honour, no less than his persistent devotion to duty, won the respect of all who had access to his presence.

**George I (1845-1913).** King of the Hellenes. Born at Copenhagen, Dec. 24, 1845, a younger son of Christian IX of Denmark and a brother of Queen Alexandra, he was named Christian William. In 1862 the Greeks were looking for a king to replace the expelled Otto. By request, the British government nominated the young prince of Denmark. His selection was approved by the Greeks, and he took the name of George, resigning at the same time his rights to the crown of Denmark. His long reign, which began in 1863, was on the whole successful. But towards the end of his life his country was drawn into the Balkan War, after it had previously carried on a struggle with Turkey. On March 18, 1913, in the midst of the Balkan struggle, the king was murdered by a subject while visiting Salonica. His wife was Olga, a Russian grand duchess. His son Constantine succeeded him.

**George II (1890-1947).** King of the Hellenes. He was born at Tatoi, near Athens, July 20, 1890, the eldest son of King Constantine. He married Elizabeth of Rumania (1894-1956), and came to the throne upon the second abdication of his father, Sept. 27, 1922, but a series of political risings led to his being forced into exile, Dec. 18, 1923. On Nov. 3, 1935, a plebiscite showed a large majority in favour of restoring the monarchy, and King George was recalled. He soon sus-

pending the constitution and upheld the dictatorship of Gen. Metaxas.

At the outbreak of the Italo-Greek war in Oct., 1940, the king assumed command of the army, but was compelled to flee to Crete with his government on April 23, 1941, when German troops were nearing Athens. Taken off the island by a British warship, he went to Cairo and London. In 1943 he announced that as soon as the Greek government was re-established, free general elections would be held. Civil war breaking out late in 1944, he appointed Archbishop Damaskinos (*q.v.*) as regent, Dec. 31. A peace treaty provided for a plebiscite on the question of the king's return. In 1946 the royalist party became the strongest in parliament; the plebiscite favoured the king; and he returned to Greece in Sept., but died in Athens after a heart attack, April 1, 1947. His brother Paul succeeded him.



George II, King of the Hellenes

**George (1819-78).** King of Hanover. Born in Berlin, May 27, 1819, he was the only son of Ernest Augustus, who became king of Hanover in 1837. In 1833 he became blind, but this was not considered a bar to his accession in 1851. His illiberal ideas involved him in constant quarrels with his subjects, leading to his expulsion in 1866, when Hanover was annexed by Prussia.

George found a refuge in Austria, where he worked hard but vainly to recover his lost land. He died in Paris, June 12, 1878, and was buried at Windsor. He is known as George V, his four predecessors being also kings of Great Britain. His only son was Ernest, duke of Cumberland.

**George (1832-1904).** King of Saxony. Born at Dresden, Aug. 8, 1832, he was the youngest son of King John (1801-73). He was gazetted into the artillery in 1846 and commanded a cavalry brigade in the Austro-Prussian War of 1866. In 1888 William I made him a Prussian field marshal. On the death of his brother Albert, in 1902, he succeeded to the throne, and died Oct. 15, 1904.

**George, Sir Ernest (1839-1922).** British architect. Born in London, June 13, 1839, he was educated at Brighton, Reading, and the Royal Academy. He received the queen's

gold medal of the Royal Institute of British Architects in 1896, President of the institute 1908-09, he was knighted in 1911 and elected R.A. in 1917. Examples of his work are to be seen in the Royal Exchange buildings, the Golders Green crematorium, also the Royal Academy of Music, the Shirpur Palace, India, and in the restoration of Berkeley Castle. He died Dec. 8, 1922.

**George, HENRY (1839-97).** An American economist. Born at Philadelphia, Sept. 2, 1839, he



*Henry George*

became a printer in California, and from that a journalist. He began to study economic questions, and in 1871 made himself known by his book, *Our Land Policy*.

In 1879 this appeared as *Progress and Poverty*, and became enormously popular in Europe as well as in America. George became the apostle of land nationalisation, which he proposed to bring about by means of the single tax. He died Oct. 29, 1897. He also wrote *Protection and Free Trade*, 1886; *The Condition of Labour*, 1891; and *Principles of Political Economy*, 1898. *Consult Life*, by his son Henry, 1900.

**George, STEFAN (1868-1933).** German poet. He was born July 12, 1868, at Bingen, educated at Darmstadt, and lived for a time in Paris, coming under the influence of Mallarmé and Baudelaire and making the acquaintance of Verlaine. George founded, in 1892, *Blätter für die Kunst*, with the motto of Art for Art's Sake. He published in 1907 *Der Siebente Ring*, and in 1914 *Der Stern des Bundes*, his best known works, noted for perfection of form. His later works were *Das Neue Reich*, 1928, and *Gedichte*, 1931. The translator of Dante, Baudelaire, and Shakespeare's sonnets, he expresses in poetry a mystic symbolism. He died at Locarno, Dec. 3, 1933. *Pron. gay-org.*

**George, WALTER GOODALL (1858-1943).** British athlete. Born at Calne, Sept. 9, 1858, he made his first success in 1877. Quickly establishing himself as a pre-eminent runner in all distances over the half-mile, he won in 1884 the half, mile, and four miles championships in one afternoon at Birmingham, and in the same year

created records for nearly every distance from 1,000 yds. to 12 m. Turning professional, he covered the mile in 1886 in the world's record time of 4 mins. 12½ secs.; this record stood for 37 years. George won 12 amateur track championships and over 1,000 prizes. He died at Mitcham, June 4, 1943.

**George, WALTER LIONEL (1882-1926).** British author. Born and educated in Paris, he took to journalism in 1907. His first work was *France in the 20th Century*, 1908. His novels, in which he deals outspokenly with life's problems and presents an interesting amalgam of English and French methods, include *A Bed of Roses*, 1911; *Israel Kalisch*, 1913; *The Making of an Englishman*, 1914; *The Stranger's Wedding*, 1916; and *Caliban*, 1920. His studies, *Women and Tomorrow*, 1913; *Intellect of Woman*, 1917, are notable. He died Jan. 30, 1926.

**George Cross.** British decoration created by George VI on Sept. 23, 1940. Ranking next to the Victoria Cross (*q.v.*), it is primarily intended for men and women in all walks of civilian life, but there is also a military division. The immediate object of its institution was to reward acts of gallantry arising out of enemy action during the Second Great War, but it is also given in peace time.

Designed by Percy Metcalfe, the George Cross is of silver, with four equal limbs having in the centre a circular medallion bearing the design of S. George and the dragon, surrounded by the inscription "For Gallantry." In each of the four angles between the limbs are the letters G VI. The reverse is plain and bears the name of the recipient and the date of the award. The cross is suspended from a dark blue ribbon threaded through a bar adorned with laurel leaves. *See Medals colour plate.*

The first recipient was T. H. Alderson, a rescue-party leader,

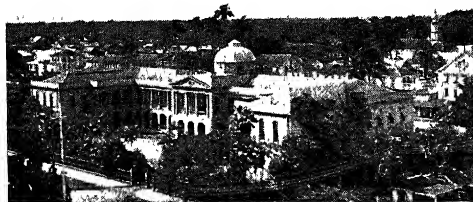
who received the decoration on Oct. 1, 1940, for devotion to duty during an air raid on Bridlington. In April, 1942, the George Cross was awarded to the island of Malta. It replaces the Empire Gallantry Medal of 1923, and holders of the latter living in 1940 were given the George Cross.

**George Dandin ; ou, LE MARI CONFONDU (George Dandin ; or, The Baffled Husband).** Three-act comedy by Molière, first produced at Versailles, July 18, 1668. Dandin is a rich peasant who marries above his station and has the privilege of settling the debts of his wife's parents. They with their daughter render his life wretched, especially by making him out to be wrong when he is right; hence his remark, *Vous l'avez voulu, vous l'avez voulu, George Dandin ! (You would have it, you would have it, George Dandin !)*

**George Medal.** British decoration created by King George VI on Sept. 23, 1940. Like the George Cross, it is primarily intended for civilians, but it is sometimes awarded to members of the armed forces performing acts of gallantry having some bearing on civil life. The medal was frequently awarded during the Second Great War to troops removing unexploded bombs in cities. *See Medals colour plate.*

**Georgetown.** Seaport and capital of British Guiana, S. America. It stands near the mouth of the river Demerara, with a fortified harbour and lighthouse. The city, sometimes called Demerara, lies below the level of high water, which is kept out by a sea-wall called the Ring. The houses are mostly of wood, the streets are broad and shaded by palm trees, and there are several canals. The chief buildings are the Anglican and R.C. cathedrals, government buildings, several colleges and hospitals, botanical gardens, museum, library, and an asylum.

The rlys. connect up with Ma-haica and Rosignol, extending about 80 m. There are 272 m. of good motor roads. The climate is humid and hot, and owing to the swampy surroundings is unhealthy. Exports include coffee, sugar, cocoa, rum, gold, diamonds, oils, and balata. The town's chief difficulty, a lack of good drinking



Georgetown, British Guiana. Government buildings of the S. American colony

water has been overcome by boring artesian wells and the provision of storage tanks. Pop. 75,539.

**Georgetown.** Part of the city of Washington, D.C., U.S.A. Standing on the Potomac, at its confluence with Rock Creek, about 2 m. W. by N. of the Capitol, it is primarily a residential district. Georgetown university, founded in 1789, is the oldest R.C. university in the U.S.A.; its school of foreign service provides training for diplomatic careers. Until 1871 Georgetown was a separate city, but then was incorporated in the District of Columbia, and seven years later became part of Washington. See District of Columbia.

**Georgetown.** Seaport of S. Carolina, U.S.A., a port of entry and the co. seat of Georgetown co. Situated at the head of Winyah Bay, it is 14 m. from the Atlantic and 60 m. by rly. N.E. of Charleston. The Big Peedee and other rivers which flow into the bay there provide inland navigation for a 1,000-mile area. An important shipping point for rice and indigo in the 18th century, it was first colonised about 1700, and the town was laid out before 1734. Georgetown's factories include turpentine distilleries and the largest pulpboard mill in the world. Exports include rice, timber, turpentine, naval stores, cotton, tobacco, and fish. Here Lafayette first landed in America, April 24, 1777. Pop. (1950) 6,004.

**George Town or Penang.** Seaport of Malaya, capital of Penang, created a city 1857. It stands on the N.E. shore of Pulo Penang, also called Prince of Wales Island and Arca Island, with a harbour second only to Singapore, off the W. coast of the Malay Peninsula. It is strongly fortified. Chief exports are rice, sugar, pepper, tin. The pop. (1955 est. 250,000) includes Indians, Chinese, and Malays.

George Town was severely damaged by Japanese bombers during the invasion of Malaya in Dec., 1941. On Dec. 19 it was completely denuded of troops and Europeans, and the Japanese entered next day. Following the Japanese capitulation, Royal Marines went ashore at George Town on Sept. 3, 1945, after a local agreement had been signed on board H.M.S. Nelson.

**Georgia.** One of the original 13 states of the U.S.A. Chartered in 1732, it was the last British colony established, and was named after George II. It is in the S.E. of the country, bounded N. by Tennessee

and N. Carolina, W. by Alabama, S. by Florida, and E. by S. Carolina and the Atlantic. In area 58,876 sq. m., it is the largest state E. of the Mississippi and the one with the largest wooded area. Its coastline is broken and fringed by numerous islands, separated from the mainland by shallow sounds.

The surface comprises three natural divisions: Upper Georgia, the mountainous region of the N.; Middle Georgia, a fertile plateau; and the swampland of Lower Georgia. The chief rivers are the Savannah, the Ogeechee, and the Altamaha, all of which flow into the Atlantic, and the Chattahoochee and the Flint, which unite to form the Apalachicola flowing S. into Florida.

Sea island cotton grows in the coastal belt, and Georgia ranks third among the cotton producing states of the U.S.A. Sugar, peanuts, maize, tobacco, and peaches are abundant crops, and the forests provide half the nation's naval stores. The pastures feed a million head of cattle and as many swine.

The first colonists settled at Savannah in 1733, under a scheme sponsored by Gen. Oglethorpe. Georgia became a province twenty years later. Savannah was captured by the British during the American Revolution, and held until 1782. The Creek and Cherokee Indians were removed from the state between 1832 and 1838. Georgia seceded from the Union in 1861, but was readmitted in 1870. After occupying Atlanta, Gen. Sherman made his famous march to the sea, which he touched at Savannah.

Consult A Standard History of Georgia and Georgians, L. L. Knight, 1917; Physical Geography of Georgia, L. La Forge, 1925.

**Georgia,** GULF OR STRAIT OF. Inlet of the N. Pacific Ocean, dividing Vancouver from the British Columbian mainland. Its N. extension, Queen Charlotte Sound, connects with the Pacific Ocean, while its S. continuation leads to Juan de Fuca Strait and Puget Sound. Its length is about 250 m., its breadth 29 m.



Georgia. Map of this Caucasian republic of the U.S.S.R. lying between the Black and Caspian Seas

Asbestos, barite, bauxite, manganese, and iron ore are mined, and kaolin and fuller's earth are produced. Manufactures include clothing, iron and steel goods, and Portland cement.

Georgia has the highest negro pop. of any state—1,084,927 of a total of 3,123,723. Among the universities are several for negroes. Two senators and 10 representatives are returned to congress. Georgia alone in the U.S.A. has lowered the voting age to 18. The capital is Atlanta; Augusta, Macon, Columbus, and Athens are other cities, with the seaports of Savannah, Darien, St. Mary's, and Brunswick.

**Georgia.** Constituent republic of the U.S.S.R. It has an area of about 37,570 sq. m. and an est. pop. of 3,542,300, and is bounded N. by the Caucasus mts., E. by Azerbaijan S.S.R., S. by Armenia S.S.R., S.W. by Turkey, and W. by the Black Sea.

A deep valley corridor runs 500 m. between the Black and Caspian Seas, with the Caucasus rising steeply above it to the N., and the Armenian mts. skirting it almost as steeply on the S. The foothills from both ranges meet across the valley about 100 m. from the Black Sea, and form a watershed, the Suram mts. W. from these low mts. flows the



Rion to the Black Sea, and E. flows the Kura to the Caspian. Georgia is the land along these rivers for 250 m., and the highlands N. and S. that enclose the valley.

Through the two valleys, and tunnelling the Suram mts., is the rly. from Batum to Baku, the centre of a petroleum industry, and an oil pipe-line follows the rly. to the Black Sea. Georgia to E. of the watershed is grouped around the capital, the ancient city of Tbilisi, formerly Tiflis; the W. slope centres on Kutais. Batum, in Adzharia A.S.S.R., serves the whole Transcaucasian area as its port, and Poti at the mouth of the Rion serves Kutais province. N. of Poti a strip of Black Sea coast including Sukhum has been incorporated as Abkhazia A.S.S.R., in Georgia. This district, backed by the slopes of the Caucasus, resembles the Riviera in its agreeable climate, but is more fertile. A rly. line running near the coast into the R.S.F.S.R. was completed in 1946.

Georgia has an exceptionally wide range of produce: wheat, maize, barley, cotton, and tobacco, and tea on the coastal strip. Rice is grown in the S.; experiments have been made in sowing it by aircraft. Plants include bamboo, eucalyptus, and the tung tree, while the Armenian hills are richly timbered. Below Tbilisi are wide cattle-breeding steppes. Silk is extensively produced. The vine flourishes, especially on the Caucasian side of the Kura valley. Olives, citrus fruits, apricots, peaches, plums, and apples abound. The country is rich in minerals, manganese and coal occurring in deposits each estimated at 250,000,000 tons. There is also some copper and oil.

Although their country forms one of the world's natural highways from E. to W., the Georgians have maintained their independence for 2,000 years, preserving their identity, language, and religion. In 302 B.C. they threw off the yoke of Alexander the Great. Christianity became the state religion in A.D. 323, and despite invasions by Arabs, Turks, Persians, and the Mongol Jenghiz Khan and Tamerlane, it prospered until the Bolshevik revolution.

Georgia was annexed to Russia by consent in 1801, when its king, George XIII, appealed to the Christian tsar of Russia for protection against the Turks. But attempts to Russianise the country and its people failed. When the Bolsheviks seized power in 1917,

Georgia, Azerbaijan, and Armenia agreed to form an independent federal democratic republic known as Transcaucasia. A united parliament (Seym) met April 22, 1918, but the new republic was soon dissolved into its three former constituents, and Georgian independence was proclaimed on May 26. On Feb. 25, 1921, following a revolution, the Georgian S.S.R. was set up. Next year the Transcaucasian republics were revived, and in 1936 all three members became constituent republics of the U.S.S.R. J. V. Stalin was born in Georgia and began his revolutionary career there, being exiled to Siberia in 1905 for his activities in Batum. *Consult* History of the Georgian People, W. E. D. Allen, 1932.



Georgian. Mompesson House, in the Close, Salisbury, typical of this style of domestic architecture  
By courtesy of Country Life

**Georgian.** Style of architecture which prevailed in Great Britain during the reigns of the first three Georges (1714-1820). A product of the later Renaissance, it owed its inspiration mainly to Sir Christopher Wren. Its best characteristic was simplicity of plan and elevation; its worst was a tendency towards the pedantic. Wren's example was followed by numerous professional architects.

Contemporary with him were William Kent, who made an effective design of the Horse Guards, Whitehall, and spoilt a good portion of Wren's interior decoration at Kensington Palace; Isaac Ware, who built Chesterfield House, and in the middle of the 18th century was considered the leading authority on architectural

matters; and Sir William Chambers (*q.v.*), who was responsible for Somerset House (*q.v.*), one of the finest creations of Georgian classicism in London. Not even Chambers's work, however, escapes pedantry.

It is chiefly in the smaller houses that the significance and charm of "Georgian" may be found. In the towns uniformity was principally aimed at, and any one of the many Georgian streets in London can show that Georgian architects, in achieving uniformity, gained also two other essentials of successful street architecture—repose and dignity. In plan the Georgian house is a plain rectangle, solidly constructed, frequently of red brick. Its façade is always of the plainest, and is pierced by symmetrical rows of tall "sash" windows.

A porch was exceptional, and the typical Georgian doorway was enclosed by classic columns carrying their correct entablature, and surmounted by a hood which varied in shape and in the extent of its projection, the tendency being towards a shallower type.

The roof was invariably "hipped," i.e. it sloped backwards from each side, and the front slope was pierced by a row of dormer windows. At the beginning of the period it was the practice to extend the roof so as to form overhanging eaves with a heavy wooden cornice; later, the roof was stopped at the edge of the walls by a more or less substantial parapet which

had the effect of heightening the façade and hid the dormers. The interior decoration of Georgian houses culminated in the work of Robert Adam (*q.v.*) and his brother. Georgian architecture has been revived with success in the building of garden cities and suburbs. *See* Architecture; *consult also* The Decorative Part of Civil Architecture, W. Chambers, 1825.

**Georgian Bay.** Opening of Lake Huron, Canada. It is the N.E. arm of the lake, and is almost cut off from the main waters by a peninsula which is part of Ontario, and Grand Manitoulin Island, the opening between the two being only about 30 m. wide. It is about 120 m. long and 50 m. broad, and its various bays receive several of the rivers of Ontario.



**Georgics** (Gr. *geōrgikē*, husbandry). Didactic poem by Virgil, in four books. Composed 37–31 B.C., it deals with agriculture, fruit trees, domestic animals, and bees. It abounds in passages of great beauty, while technically it is a flawless poem.

**Geothermal Gradient.** Geological term denoting the rate at which the rock temperature rises with increasing depth below the surface of the earth. The increment in temperature in the upper part of the earth's crust is generally assumed to average 1° C. for every 30 metres of depth; at this rate the temperature should be 100° C. at about 10,000 ft. In coal and oil fields, and near recent igneous activity, the geothermal gradient is steeper, whilst in stable regions of considerable geological age, it is less.

**Geotropism** (Gr. *gē*, earth; *tropē*, a turning). The bending of part of a plant in response to the influence of gravity. Typically main roots grow vertically downwards, main shoots upwards. The effect of gravity on either type of organ in any other orientation is

6th century, and the Gepidae were not heard of again, being merged in the Avars (*q.v.*).

**Gera.** Town of E. Germany, on the White Elster, 35 m. S.S.W. of Leipzig. A rly. and air junction, h.q. of the region of Gera, and until 1920 capital of the former principality of Reuss, it was first mentioned as a settlement in 995, and from the 13th century belonged to a junior branch of the Saxon dynasty. The chief buildings include the town hall, 1571; two fine churches, Holy Trinity and S. Salvatore, dating respectively from the 13th and 18th centuries; and a museum. Industries include the manufacture of textiles, machinery, and various kinds of leather; there are also extensive engineering plants. Pop. (est. 1953) region, 751,000.

**Gerace.** City of Italy, in the prov. of Reggio di Calabria near the ancient Locri. It stands on the slope of a mountain, at an elevation of 1,570 ft., 4 m. from the sea, 58 m. by rly. N.E. of Reggio. It has a restored cathedral, wrecked by an earthquake in 1783, with Romanesque remains. In the

from which, by rly., it is 306 m. distant, N. by W. It is also the terminus of a rly. which penetrates inland for 600 m., serving the Yal-goo, Mt. Magnet, Cue, and Nannine goldfields. Exports comprise gold, silver, and lead, wool, wheat and tomatoes, the produce of this area. Pop. (1954) 8,309.

**Geraniaceae.** Large family of plants, chiefly herbs. They are natives of temperate and tropical regions. The leaves are opposite or alternate, of varied form; the flowers regular or irregular. Many species have astringent or aromatic properties, or abound in volatile oil. Others are rich in oxalic acid, and some have edible tubers. They are so called from the resemblance of the seed-pod to a crane's bill (Gr. *geranion*).

**Geraniol.** An unsaturated alcohol occurring in many essential oils, particularly palmarosa oil from the grass *Cymbopogon martinii*. It is important in the perfumery industry, a basis of artificial floral oils, *e.g.* notably rose.

**Geranium.** Typical genus of the family Geraniaceae. It consists mostly of small plants with small



Geranium. Foliage and flowers of, 1, *G. sanguineum*, Europe and Western Asia; 2, *G. anemoniaefolium*, Madras; 3, *G. lucidum*, Europe, West Africa, Asia

to produce a higher concentration of auxin in the lower side. As a result the lower side of a shoot and the upper side of a root so affected grow faster till the tip is directed upwards or downwards as the case may be.

**Gepidae.** An ancient Teutonic people, whose home in the 3rd century A.D. is said to have been the islands in the Baltic at the mouth of the Vistula. Akin to the Goths, and speaking a similar language, they joined in the invasion of Gaul in the 5th century; while after the death of Attila in A.D. 453 another branch set up in the old Roman province of Dacia (modern Transylvania) a kingdom which was destroyed by Justinian in the

vicinity are sulphur springs and iron and coal mines, while the district is noted for its wine called Lacrima di Gerace. The ruins of Locri, founded in the 7th century B.C., lie nearer the coast, and near the old Torre di Gerace were discovered ruins of an Ionic temple. Pop. (1951) 5,050.

**Geraint.** A British legendary character. Tributary prince of Devon, and one of the knights of the Round Table, he appears in the Mabinogion romance, Geraint the son of Erbin. In Tennyson's Idylls of the King, Geraint is married to Enid, daughter of Yniol.

**Geraldton.** Port of W. Australia. It stands on Champion Bay, and is the chief town N. of Perth,

regular flowers and palmate or divided leaves, often with a pungent odour. *G. anemoniaefolium*, native of Madras, however, has a somewhat shrubby stem a foot high, and large purplish-red flower. *G. pratense* (Europe) has large blue flowers, and the equally fine *G. sanguineum* (Europe and W. Asia) has blood-red flowers. *G. lucidum* (Europe, W. Africa, Asia), though its bright rosy flowers are small, has a handsome appearance with its red stems and general shining glossiness. *G. tuberosum* and *G. dissectum*, from S. Europe and Australia respectively, have edible tubers. Garden geraniums are really pelargoniums (*q.v.*). See Balsam; Herb Robert; Wood Sorrel.

**Gerard** of CREMONA (c. 1114-87). Arabic translator. Born at Cremona, he lived mostly at Toledo in Muslim Spain, where he began a series of translations of Arabic works into Latin. Of these perhaps the most important were a version of the *Almagest* of Ptolemy, and translations of the works of Hippocrates, Galen, Aristotle, Euclid, Abulcasis, Al-Kindi, Alfarabi, Geber, and Avicenna. Gerard was mainly responsible for the dissemination of that mature Oriental wisdom which so greatly helped the development of western arts and sciences.

**Gerard, ÉTIENNE MAURICE, COUNT** (1773-1852). French soldier. Born in Lorraine, April 4, 1773, he



Étienne Gérard,  
French soldier

entered the army in 1791 and became chief-of-staff to Bernadotte by 1805. He was prominent in the battles of Austerlitz, 1805, Jena, 1806, and Wagram 1809,

fought also in Spain, and in recognition of his part in the victory of Bautzen, 1813, was made a count by Napoleon. In 1814 Gerard made his peace with the new regime, but rejoined Napoleon on his return from Elba and fought at Ligny. He was permitted to return to France in 1817, was made a marshal in 1831, and, commanding the Belgian expedition, took Antwerp in 1832. He died in Paris, April 17, 1852.

**Gérard, FRANÇOIS PASCAL SIMON, BARON** (1770-1837). A French painter. He was born in Rome, May 4, 1770, and studied in Paris under David, being made a member of the revolutionary tribunal in 1793 by his master's favour. His first great success as an artist was with *Bélisaire*, 1795, and after the praise he received for a portrait of Madame Bonaparte, 1799, he became the most famous portraitist of his day. All the chief figures of the age were portrayed in his cold colour and classic style, and he died at the height of his fame, Jan. 11, 1837.

**Gerard, JOHN** (1545-1612). English botanist. Born at Nantwich and educated as a surgeon, in early life he travelled in N. Europe, and settled to practise in Holborn, London. On the hill facing the Fleet river he had a wonderful physic garden with over 1,000 species of plants, of which he published a list, 1596. He is chiefly

famous for his *Herball* or *Generall Historie of Plants*, 1597, an important botanical work, based on the *Pemptades* of Dodons, 1583, while the large majority of the woodcuts were derived from the *Eicones* of Tabernaemontanus, published at Frankfurt, 1590.



John Gerard,  
English botanist

**Gérardmer** or **GEROMÉ**. Town of France. In the dept. of Vosges, it is 18 m. S. by W. of St. Dié. It stands near the lake of the same name, high among the mountains, and is, on account of the beautiful scenery around it, much visited by tourists. It has some manufactures and its cheeses are famous. In the market place is an enormous lime tree, 300 years old. There are baths and a hydropathic establishment in the town. Gerard, duke of Alsace in the 11th century, is its reputed founder.

**Gerasa**. City of ancient Palestine, a member of the Decapolis. It is situated among the mountains of Gilead, about 20 m. E. of the Jordan, and possesses notable remains of the 2nd and 3rd centuries A.D. It has been identified with Gadara and other places, but the identification is open to doubt. In 1925 excavations here brought to light stage doors and columns of a Graeco-Roman theatre intact. The modern Jerash, in Jordan, is on its site.

**Géraud, ANDRÉ**. French journalist, better known under his pseudonym of *Pertinax* (q.v.).

**Gerber's Law**. A theoretical relationship between the safe range of stress and the corresponding mean stress and the ultimate stress of a metal. The law has been used by metallurgists, but it is no more general in application than are many other similar formulae.

**Gerbrandy, PIETER SJOERDS** (b. 1885). Dutch jurist and statesman. He was born April 13, 1885, and educated at the gymnasium in Zetten and the free university in Amsterdam. Called to the bar in 1911 and a member of the Friesland provincial government from 1919, he was a professor of commercial law at the free university, 1930-39. Appointed minister of justice, he came to England with the rest of the Netherlands government in May, 1940, succeeding D. J. de Geer as prime minister in Sept. He was also minister for colonies, 1941-42, and for the coordination

of warfare, 1942-45. He returned with his government to the Netherlands in May, 1945, but, in conformity with his wartime declarations, resigned immediately. An active promoter of broadcasting, Gerbrandy published a book on television in 1939.

**Gerenuk**. East African antelope. Reddish fawn in colour, with a wide band of black down the back, it is remarkable for its very long neck which is out of all proportion to its body and gives it almost the appearance of a diminutive giraffe. Its chief food is the leaves and twigs of small trees and bushes.

**Gerhardi, WILLIAM ALEXANDER** (b. 1895). British author. He was born in St. Petersburg (Leningrad), Nov. 21, 1895, son of a British cotton-spinning manufacturer, educated in St. Petersburg and at Worcester College, Oxford. He went with the British military mission to Siberia, 1918-20. His first novel, *Futility*, appeared in 1922. His books include a critical study of Chekhov, 1923; *The Polyglots*, 1925; *Memoirs of a Polyglot* (autobiography), 1931; *The Casanova Fable* (with Hugh Kingsmill), 1933; *Of Mortal Love*, 1936; *The Romanoffs*, 1940; *The Sorrowful Planet*, 1945; *Highlights of Russian History*, 1947.

**Gerhardsen, EINAR** (b. 1897). Norwegian politician. As one of a gang of road repairers in 1914, he became interested in the Norwegian labour movement. Appointed secretary of the Labour party in 1936, he was mayor of Oslo when the Germans invaded Norway in April, 1940; he left the capital with the government, but returned to his post in July. Dismissed by the Germans, he worked on the roads and joined the underground resistance movement; was deported to Germany in 1941; but was brought back to Oslo in 1944 and held at the Gestapo headquarters as a hostage against R.A.F. raids. After the liberation of Norway in May, 1945, he resumed his mayoralty and chairmanship of the Labour party, and became prime minister, being confirmed in office in 1945, 1949, and 1955.

**Gerhardt, ELENA** (b. 1883). German-born British singer. Born at Leipzig, Nov. 11, 1883, she studied at the conservatoire there with Hedmondt and later Nikisch. She became one of the foremost singers of *Lieder*, her interpretation of the songs of Schubert, Schumann, Brahms, and Wolf establishing her fame throughout Europe and the U.S.A. She was first heard in England in 1906 and

in the U.S.A. in 1912. She gave series of recitals regularly in London, Paris, and New York, and made gramophone records. In 1953 she published an autobiography, *Recital*.

**Geriatrics** (Gr. *geras*, old age; *iatros*, physician). Branch of medicine concerned with diseases of the elderly. The principles of medical practice apply to the old as they do to people of all other ages, and there are few diseases which are peculiar to the aged, yet there are certain differences of approach which warrant the designation of specialty. Because of the increase in the proportion of the elderly in the population of the U.K., geriatric medicine is increasing in importance. Old people admitted to hospital, for whatever reason, were at one time expected to remain there till the end of their days. Most were kept continuously in bed, because of an exaggerated fear of falls. Though they were nursed with devotion, many developed contracted limbs, bed sores, became incontinent, and degenerated into inert apathetic bodies. Reorientation of ideas about the treatment of the elderly sick began with the pioneer work of Marjory Warren at the West Middlesex Hospital. This put the emphasis on active rehabilitation, to increase mobility and maintain independence so that the old person could keep his (her) place in the community, preferably in his (her) own home.

Admission to hospital is treated as temporary, and this is carefully explained to the younger relations into whose care the patient will be discharged. Many hospitals, indeed, admit elderly people for a short spell solely to relieve the burden on the younger generation. Ancillary services, in particular chiropody, are brought into play. Provision of correct spectacles and of hearing aids, where appropriate, helps to encourage activity. Improved surgery and anaesthesia make practicable operations previously considered out of the question for the elderly. The social conditions of the elderly sick are often a deciding factor in the treatment of a case. Many old people live alone, in itself a problem much less frequently encountered in patients of other ages. The geriatric physician knows that he is dealing with degenerative processes and seeks to postpone further deterioration.

**Géricault, JEAN LOUIS ANDRÉ THÉODORE** (1791-1824). French painter. Born at Rouen, Sept. 26,

1791, he studied painting under Vernet and Guérin. His careful picture of a mounted chasseur officer at the Salon of 1812 was his first success in a series of military subjects. After fighting for Louis XVIII during the Hundred Days, he visited Rome and Florence. His most notable picture was *The Raft of the Medusa*, 1819 (in the Louvre), a shipwreck scene of exceptional size (24 ft. by 18 ft.), painted with a fine sense of natural form and dramatic detail; it was shown in London, 1820-22, where Géricault then lived. He died in Paris, Jan. 26, 1824. His work marks the breaking away of French painting from the classic tradition of David.

**Gerizim**. Hill of Samaria. It stands near Shechem or Nablus, and is associated with an adjoining hill, Ebal. The curses and blessings in connexion with the law were pronounced respectively from these two hills, and the Samaritan temple was built on Gerizim.

**Germ** (Lat. *germen*, bud). In embryology, the vital particle from which an organism (animal or plant) develops; in bacteriology, a bacillus or micro-organism which causes a disease. See *Bacillus*; *Bacteriology*; *Embryology*.

**German, SIR EDWARD**. Name used by Edward German Jones (1862-1936), British composer.



Sir Edward German,  
British composer

He was born at Whitechurch, Salop, Feb. 17, 1862, and educated at Bridge House School, Chester. He began training as an engineer; but so impressed the conductor of the Whitechurch choral society and orchestra (in which German played the violin) that in 1880 he was sent to study at the Royal Academy of Music. In 1888 he became musical director at The Globe theatre, London, and while there produced the incidental music to *Richard III*, 1889. The reputation this gained for him was enhanced by music to *Henry VIII*, especially the dances, written for The Lyceum in 1892. German completed Sullivan's unfinished opera, *The Emerald Isle*, 1901,



J. Géricault,  
French painter

and composed *Merrie England*, 1902, *A Princess of Kensington*, 1903, and *Tom Jones*, 1907. His other works include symphonies, a Welsh Rhapsody, and *Theme and Six Diversions* for orchestra. His work, fluent and melodious, was widely popular. Knighted in 1928, he died Nov. 11, 1936.

**German Catholics**. Religious sect founded in 1844 by two dissenting R.C. priests, independently of each other, with a first large congregation at Breslau. The movement, which wanted independence from Rome and rejected large parts of R.C. dogmas, spread rapidly and held a council at Leipzig, presided over by Robert Blum, the leader of democracy executed in 1848. In 1846 there were 200 congregations and 70,000 officially registered members. The new church declined under the reactionary measures, merged with other sects, or lost its members by emigration to the U.S.A. and conversion to Protestantism.

**Germania**. Latin name for Germany. As such it is the title of the work of Tacitus on the manners and customs of the tribes of Germany about the opening of the Christian era, this being the chief authority on the subject. It is also used as a personification of the German people. An example is the gigantic statue of Germania, 33 ft. high, which stands on the Niederwald, overlooking the Rhine. It commemorates the Franco-Prussian War of 1870-71, and the union of Germany.

**Germanicus, CAESAR** (15 B.C.-A.D. 19). Roman general. A son of Nero Claudius Drusus, Germanicus was

nephew of the emperor Tiberius. Having distinguished himself against the Pannonians, A.D. 7-9, in 12 he was consul, and as commander in Gaul and on the Rhine, quelled a dangerous mutiny. To occupy his soldiers, he crossed the Rhine, attacked and defeated the Marsi and Chatti, and in 16 gained a victory over Arminius on the Campus Idistavicus (which lay near Hameln on the Weser).

Recalled to Rome by the jealous Tiberius, he was sent with extensive powers to settle affairs in the East. His mission was successful but he was continually thwarted



Germanicus  
From head of marble  
statue found at Gabii  
1793, now in the Louvre,  
Paris

by Calpurnius Piso, governor of Syria, probably instructed by Tiberius. Returning from a visit to Egypt, he died at Daphne, near Antioch, poisoned, it was said, by Piso. His body was taken to Rome and buried amidst general grief. His free translation of the Phaenomena, an astronomical poem by Aratus, is extant. Among his children were the future emperor Caligula and Agrippina, mother of Nero.

**Germanium.** Rare metal, first identified by C. Winkler in 1886, after a careful analysis of the silver mineral argyrodite. He discovered that it fitted into the place in the periodic table reserved by Mendeléeff for "eka-silicon" and thus it is one of the elements which the Russian chemist was able to predict some 17 years before it was actually discovered.

Germanium, symbol Ge, is a greyish-white metal, hard and brittle; the crystal structure is of the diamond type, with an inter-atomic distance of 2.44 angstroms; atomic no. 32; atomic wt. 72.60.

It is obtained from the mineral germanite in South Africa, and recovered from zinc residues and the flue dust from certain kinds of coal in the U.S.A. Its melting point is 958.5° C., but a 12 p.c. germanium-gold alloy forms an eutectic which melts at 365° C. and is used as a gold solder. Germanium crystals also have peculiar electrical properties (they are intrinsic semi-conductors) and this makes it possible to use them as extremely small rectifiers, amplifiers, etc., a field in which they are particularly useful being that of many of the developments of radar that followed its use in the Second Great War.

**German Measles** OR RUBELLA. Feverish condition quite distinct from ordinary measles and from scarlet fever. The incubation period is about a fortnight to three weeks, and the condition is infectious for a day or two before the fever declares itself. The infective agent is probably a filterable virus. Some instances of congenital malformation appear to be due to an attack of German measles suffered by the mother during pregnancy.

A catarrhal stage is followed by a rash, and there is inflammation of the glands of the neck. This enlargement of the glands of the mastoid and occipital regions is characteristic of the disease. The degree of fever is slight and usually a quick convalescence ensues. Papular in its first stage, the rash

suddenly fuses and resembles that of scarlet fever, appearing on the face and neck and invading the trunk.

Treatment consists of simple nursing and the alleviation of the symptoms. The patient ceases to be contagious when the rash has faded and the catarrh has subsided.

**German Shorthaired Pointer.** A breed of gun dog, originally used for hunting, and descended from



German Shorthaired Pointer. A typical specimen of this breed

the 17th-century Spanish pointers. The shorthaired pointer was bred by the Germans who crossed Spanish pointers with bloodhounds to increase their hunting powers. At the end of the 19th century further crosses made produced a utility gun dog, capable of pointing, hunting, and retrieving. It is well established in Great Britain. Coat colour may be solid liver, liver and white spotted, or liver and white ticked. Other colours are not recognized. Dogs should stand 23-25 ins. at the shoulder, and weigh 55-75 lb. Bitches should be 10 lb. lighter and 2 ins. smaller. The tail is docked to two-fifths of its original length.

**German Silver.** Name covering a group of alloys whose chief constituents are copper, zinc, and nickel. Compositions vary between 50 and 65 p.c. copper, 20 and 35 p.c. zinc, 10 and 30 p.c. nickel. The alloys get their name from the characteristic colour, which is due to the decolorising effect of the nickel on what would otherwise be a brass. They are used for fittings, ornaments, motor car radiators, etc., and commonly as the basis for chromium- or silver-plated goods such as candlesticks and spoons. The alloys may be drawn, spun, rolled, or wrought. Castings have a heavily cored structure typical of an alpha solid solution. White copper, used in Saxony from remote times, and the Chinese packfong, were probably the forerunners of German silver.

**German Sixth.** In music, chromatic chord consisting of a bass

note with a major third, perfect fifth, and augmented sixth above it, as here shown. It belongs to the key of its major third—in this example C—but it can be used also in other keys. The origin of the name is obscure.



**German Tinder** OR AMADOU. Hard, corky substance of *Fomes fomentarius*, a destructive tree-fungus, after it has been cut in thin slices, hammered out, and treated with saltpetre. Before the invention of the friction-match it was much used to obtain fire from the flint and steel tinder-box. Pieces of the dried fungus, without treatment, will smoulder for hours after a corner has been ignited. Without the saltpetre it was used for making caps and other articles of clothing. An inferior amadou is made from the fungus *Fomes igniarius*.

**Germantown.** Former borough of Pennsylvania, U.S.A., in Montgomery co. In 1854 it became a part of Philadelphia. A residential district, about 5 m. N. of the central point of the city, it contains several historical houses, and is notable as the site of the first paper mill erected in the U.S.A., and for the publication of the first edition of the Bible in a European language published on American soil.

Germantown, settled in 1683 by 13 families from Crefeld, Germany, became a borough in 1689. It soon became a stronghold of the Society of Friends, who built a meeting-house here about 1693. It has two inns, the King of Prussia and the Mermaid, dating from the 18th century. Its founders were Francis Daniel Pastorius, who was a schoolmaster here, and is notable as one of the four who signed the first public protest against slavery, and Johann Kelprus. In 1789 an attempt was made to fix the capital of the U.S.A. at Germantown.

The battle of Germantown was fought Oct. 4, 1777, between the British and the American rebels. A British force under Sir William Howe was in the town when it was attacked by Washington. With his men advancing in two bodies, he attempted a surprise, but after an initial success this failed. There was some fighting in and around the houses, but the Americans had to retreat with a loss of about 1,100 men (of whom 400 were taken prisoner). British losses were 534.

**German Volga** A.S.S.R. See Volga German A.S.S.R.

# GERMANY: ITS PEOPLE AND ITS HISTORY

EDGAR STERN-RUBARTH, Ph.D., and J. G. ROBERTSON

*A description of the physical features and natural resources of Germany and an account of the people and their former industries and activities is followed by an historical narrative covering eleven centuries, with separate sections on literature and art; for German music see Music. For German history from 1939 see page 3740. See also articles on German cities, rivers, mountains etc.; rulers and statesmen; scholars and men of letters; and the various states of the federation*

Germany, as a political unit under varying names, has been the most powerful state in Central Europe since the disintegration of the Roman Empire. Though shifting its borders frequently and considerably in the course of centuries, it has occupied in the main the plains between the Alps and the North Sea and Baltic, between the Rhine and the Oder, sometimes embracing part of what was later France, Italy, Austria, or Poland. The German republic of 1919 bordered on the Netherlands, Belgium, Luxemburg, France in the W.; Switzerland, Austria, and Czechoslovakia in the S.; Poland and Lithuania in the E.; and Denmark in the N. Its sea coast was slightly over 1,000 m. long. Its total area, as established by the Versailles treaty, covered 181,770 sq. m., 27,000 sq. m. less than that of Imperial Germany. In consequence of defeat in 1945, not only were the temporary conquests and annexations of Hitler cancelled, but Germany lost vast parts of her former territory: East Prussia and Silesia, as well as portions of Pomerania and Brandenburg.

## Physical Features

The N. of the country is flat. In the centre a range of hills and mts. cuts across from W. of the Rhine to the Sudeten range between Elbe and Oder. The highest points are, in the centre, the Harz mts., where the Brocken is 3,730 ft. high; in the E., the Giant mts. (Riesengebirge) with a peak of 5,260 ft. In the S., the Black Forest and ridges of the Alps with their spurs determine the mountainous character of the landscape; in the former rises the Feldberg, nearly 4,900 ft., in the latter the Zugspitze, 9,715 ft. Many of these upland landscapes are famous for their rich and varied vegetation, climbing and sporting facilities, attractive views, and hostels: apart from those named, there are the Taunus and Odenwald hills, the former with such famous spas as Wiesbaden and Homburg; the Spessart, Vogelsberg, and adjoining Thuringian Forest; and the Iron mts., the "Saxon Switzerland," near the great Saxon cities.

The German rivers take their direction from the character of the landscape. The Rhine, Weser,

Elbe, and Oder were German waterways leading to the country's N. shores, while in the S. the Danube, springing from the Black Forest, flows with its Alpine tributaries E. to the Balkan plains. With their affluents and a network of canals these rivers gave Germany a system of fluvial transport of 7,650 m. Among tributaries, the Neckar, Main, Moselle, and Ruhr are those of the Rhine; the Aller that of the Weser; the Saale, Havel, and Spree join the Elbe; the Neisse and Warthe flow into the Oder; among Danubian streams are the Isar and Inn. The great ports of Bremen, Hamburg, and Stettin lie respectively near the mouths of Weser, Elbe, and Oder; Emden, Lübeck, and Kiel are other seaports; the former free city of Danzig, annexed by Hitler Sept. 1, 1939, and Königsberg came respectively under Polish and Russian administration in 1945.

## The Kiel Canal

The Kiel Canal, over 60 m. long, connects the North Sea and the Baltic; since its opening in 1895, artificial waterways have linked most of the greater German rivers, from the system of the Rhine to that of the Danube.

The large number of lakes is another characteristic. Lake Constance (Bodensee) is shared by Switzerland, Austria, Bavaria, Württemberg, and Baden. There are beautiful and frequented lakes in S. Bavaria, e.g. Chiemsee, Ammersee, Tegernsee, Königssee, Walchensee, the last-named being exploited for one of the biggest electric power plants in the country. Berlin is surrounded by lakes, of which the best known is the Wannsee. Mineral springs abound, and since Roman times there have developed in Germany many spas and health resorts, with the appropriate science and technique and adequate hotel-keeping for every class of visitor. Recently the Frisian Islands, Rügen, and some coastal towns and villages have become holiday resorts.

The German climate, though widely varied, is on the whole warmer in summer and colder in winter than that of Great Britain; the mean temperature is 49° F., but there are parts in S.W. Germany where the July mean is as high

as 70° F., and in N.E. Germany, where the Jan. mean is as low as 24° F. The rainfall varies from 66 ins. a year in the Harz and other mts. to 20 ins. in the central and eastern plains; average 27.5 ins.

Of German soil, either wooded or under forest cultivation, as state or other public property, there was in 1935 a total of slightly over 30 million acres, or 27.2 p.c. of the country. Special laws compelled the owners of private forest to replant after cutting down their timber, and forestry was a highly developed branch of public service, backed by science. In the lesser hills and in the plains deciduous trees predominate, while in the higher ranges coniferous trees, although mixed with beech, oak, etc., prevail. Game, once abundant in all wooded parts, has become sparse, except in reservations. Bear and lynx have vanished; the marten has to be preserved, as well as the beaver; wild cats and badgers exist here and there. Deer, hare, and less often hart, are the main quarry of hunters, besides pheasant and other birds, among them the rare heath cock and rarer mountain cock.

## Increase in Population

Latest pre-Nazi figure, Jan. 1, 1933, gave the pop. of the Reich, including the Saar area returned to Germany in 1935, as 66,141,153, as against about 41 millions in 1871, and 61,800,000 in 1920, after the loss of territories taken by France, Poland, etc. The increase before 1914 was between 11.4 and 13 per 1,000 per year; between 7.1 and 8.8 in the years 1922-33, it was artificially increased during the Nazi period by marriage premiums, propaganda, and wage and tax concessions. The cities showed a remarkable growth from 1871. Then only eight had 100,000 inhabitants; there were 57 such in 1935, Berlin and Hamburg each having over 1,000,000. This development was due mainly to the general trend of industrialisation at the expense of agriculture. From about half in 1871, the agricultural, horticultural, and silvicultural population had dropped by 1935 to 30.5 p.c. of the total, though the loss by emigration, 4.3 per 1,000 per year during 1881-85, had dwindled to next to

nothing around the turn of the century. Subsequently the farming estates in north and east had to import seasonal labour, and the Ruhr and other mines permanent workers, from Poland, Russia, Italy, and Austria.

The social structure of the population showed that in 1933 there were 5.5 million independent people in business or professions, 5.3 million employees, clerks, and civil servants, 14.4 million workers, and 5.4 million relatives collaborating in the trade of the family head. The religious composition—in 1933, before the Nazis expelled and persecuted the Jews and attacked the churches—was 64.4 p.c. Protestants (of several denominations), 32.3 p.c. Roman Catholics, 0.9 p.c. Jews, 2.4 p.c. of another or no faith.

**INDUSTRIES.** As against the 30.5 p.c. in agriculture, etc., there was in 1933 16.5 p.c. of the working population engaged in trading and transport, and 41.4 p.c. in industry. The latter figure was increased during Hitler's preparation for war, though no reliable figures are available. This development was favoured by the wealth of coal of certain areas, the Ruhr basin, the Saar, Upper Silesia, and central Germany, where, besides coal, enormous layers of lignite are exploited for heating and power-generating purposes. Of both coal and lignite the annual production averaged 150 million tons, valued at £200 millions for the former and £40 millions for the latter. The necessary complement for basic industries, iron ore, was available only in small quantities after the return of Alsace-Lorraine to France, so that German industry, from 1920, depended upon imports for over 80 p.c. of one of its essential raw materials. On the other hand, Germany possesses very rich deposits of potash; small oil fields (considerably enlarged under the pressure of war); and mines for a number of other ores.

#### Every Kind of Production

German industries comprised virtually every kind of production. Having developed later than those of Great Britain, they started competing in the world's markets with cheaper, often shoddy, products; yet, helped by clever engineers and scientists, around the turn of the century they began to offer serious rivalry to British, and later American, goods, in quality as well as in price. A rapid transformation of the once individual enterprises into huge

combines, trusts, cartels, and syndicates, and a rising standard of living and education among the workers, represented by increasingly powerful trade unions, fostered this evolution.

The far-reaching social measures of 1881-1911 were due less to direct Socialist influence than the attempt to thwart Socialism. They included compulsory insurance against illness, accident, invalidity, and old age, completed finally in 1927 by that against unemployment. Wages were, in most industries, lower than in Great Britain and the U.S.A., but permitted a decent standard of living to the manual workers; education was largely free, or subsidised and cheap enough for workers' families to enter the best schools and talented children to join the universities.

#### Industrial Combines

The leading enterprises, those of the coal and iron barons of the Ruhr—Krupp, Thyssen, Stinnes, Kirdorf, Hoesch, Haniel, Mannesmann—often took even before 1914 the form of huge combines with ramifications among overlapping enterprises. In the electrical industry, the Siemens combine and the A.E.G. (General Electric) numbered their employees by the hundred thousand; in the dye and chemical industry, in which Germany was then leading the world, five or six main companies, each with 10,000-20,000 workers, created a cartel in 1904 which finally, in 1925, led to a complete merger embracing many other big plants, known as I. G. Farbenindustrie. Steel plants combined in a similar huge trust. The Hamburg-America and the North German Lloyd shipping companies, with several others, pooled their resources. With a majority share acquired by the state, the main electric power plants were united. By clever and unscrupulous exploiting of the inflation of 1920-23, the Ruhr magnate Hugo Stinnes brought into being a colossal heterogeneous trust comprising coal, iron, engineering, shipping, newsprint, hotel, and building interests which, though it split after his death in 1924, left its imprint upon German industrial life.

The workers used their strength in parliament and government to secure stability of wages and conditions. The republic accordingly had created a generally satisfactory system of compulsory arbitration in all kinds of labour conflicts, with superior courts to enforce decisions. In fact, without

the world economic crisis of 1930-31 and the ensuing severe unemployment and wage-cutting by government decrees, it seems likely that the rapid process of concentration among both the industrialists and the employees would have led to a compromise granting a high measure of social justice.

**TRADE FIGURES.** The German output of industrial products, for home consumption as well as for export, grew faster than that of any other European country. Under 3,000 million marks in 1880 (20 marks = £1 gold) for exports and home use alike, the trade figures rose to 6,000 and 5,000 million marks respectively in 1900; 11,600 and 10,900 million marks in 1913 and, after the setback of war, again by about 1925; in 1927-29 about 15,000 million marks each for exports and home use were shown. While previously imports—in consequence partly of American loans—exceeded exports, the foreign trade balance showed a surplus of exports from 1929 to 1933. Per head of pop. the total foreign trade (import and export) was 126 marks in 1880; 258 in 1910; 416 in 1929; 159 in 1932.

The setback during the world crisis was partly made good by great public works and an extension of electric light and power, gas and water schemes, sports arenas, and workers' model settlements. The obligatory public insurances, applicable to 20 million people, cost about 550 million marks per year for medical and health services alone, apart from 350 millions for indemnification for accidents, 725 millions for invalidity, and 230 millions for widows' and orphans' annuities.

#### Collapse of Pension Schemes

Big combines had supplementary pension schemes and assistance organizations. The whole system, safeguarded at first by strict state control and a careful distribution of funds, was sadly depleted and undermined by the unscrupulous confiscation of most of these investments by the Nazi authorities, in exchange for promissory notes and uncontrolled war loans and bonds. After defeat in 1945 the insurance had to be improvised, and grants made did not approach those of earlier years.

**SCIENCE AND TECHNIQUE.** The great chemical industry, with its virtual world monopoly in some pharmaceutical products, was the result of laboratory research on the largest scale, financed and equipped by the companies themselves. Progress in the electrical



field was due to the research of hundreds of scientists in the laboratories of Siemens, A.E.G., etc. Optical and surgical instruments, the former above all made by the Zeiss plants at Jena, had an international reputation. The production of nitrogen from air for fertilisers and later for explosives; of liquid fuel from coal; of a large range of artificial fibres for textiles, resulted from planned co-operation between industry and science. Technical high schools, equivalent in their requirements for admittance and in their final degrees to universities, were, however, strictly separated from the latter, at Charlottenburg, Hanover, Aachen (Aix-la-Chapelle), Darmstadt, Munich, Brunswick, Dresden, etc. Forestry, viticulture, and beer brewing had their own old-established high schools. German surgeons, physicians, dentists, linguists, and economists ranked very high.

#### Control of Education

Even under the Weimar republic, education was left to the control of individual states. It was completely centralised only by the Nazis for their perverse ends. Schooling was obligatory everywhere from the completion of the 6th to the 14th year, and regular evening classes until the age of 18 were then compulsory. During the period of conscription, up to 1918, success at the final examination at a *Realschule*, which taught two foreign languages and some science, carried the privilege of serving only one instead of two or three years with the forces, and of eventually qualifying for a reserve officer's commission; as did attendance at a *Gymnasium* (public school). This generally accepted belief in higher education was implanted and developed, not exclusively in a benevolent and progressive spirit, by the Imperial government. It was made to serve the creation of that obedience, discipline, militarism, and false pride of race and regime which were exploited by Bismarck, William II, and finally Hitler for the most ambitious and egoistic ventures in world politics.

**TRANSPORT.** The fact that Germany developed the most comprehensive transport system of any great power can be explained from a similar political motive. With long frontiers difficult to defend and always at least two potential adversaries in France and Russia or Poland, the military-minded rulers of Germany felt themselves compelled to have every possible

facility for moving masses of troops and war material from one end of the Reich to the other. Railways, made state properties during 1872-95, increased from 23,400 m. in 1870 to exactly 70,000 m. in 1930. The mesh of motor highways built under but planned before Hitler, if on less strategic lines, supplemented this rly. network with communications equalled only in the U.S.A. Inland navigation helped the movement of heavy goods, such as coal, ore, timber, grain, and bricks. Even before the Nazi interest in aviation for warlike ends, a considerable air transport system had been developed, from 1926 mainly the monopoly of the government, with a frequent service, mostly by Junkers aircraft, according to time-tables. Efficient bus services were owned by local government or, as in Bavaria and Saxony, by the state. Other bus routes in thinly populated parts were run by the postal authorities, often irrespective of revenue.

**THE GERMAN CHARACTER.** The "nation of poets and thinkers," as the Germans were called when split into small sovereign states, had, from the creation of Bismarck's empire, nearly unanimously adopted the Prussian method of bullying a way into the comity of the Great Powers. While frequently modest, simple, and home-loving in private life, and hard-working, in many ways idealistic, in their work, the Germans in the mass proved susceptible and willing instruments of propaganda.

#### The German Character

Even the feminine element—submissive in Imperial days, more active and frequently pacifist in the early days of the republic, and taking an active share in parliamentary and public life—gave way to the temptation of seeing the menfolk "martial" once more, of being flattered, cajoled, and finally directed into its sphere of *Küche, Kinder, und Kirche*—kitchen, children, and church.

The peculiar traits shown by the German people, if not as a whole, at least by its most distinctive parts, during half a century and more, cannot be the result of any inherent racial character. For there is no German race. About 100 million people speaking German inside and outside the Reich are no more of one blood than the 200 millions who speak English, the 90 millions who speak Spanish, or the 150 millions who speak Russian. They are Franks in the W. and centre, Dinarrians like

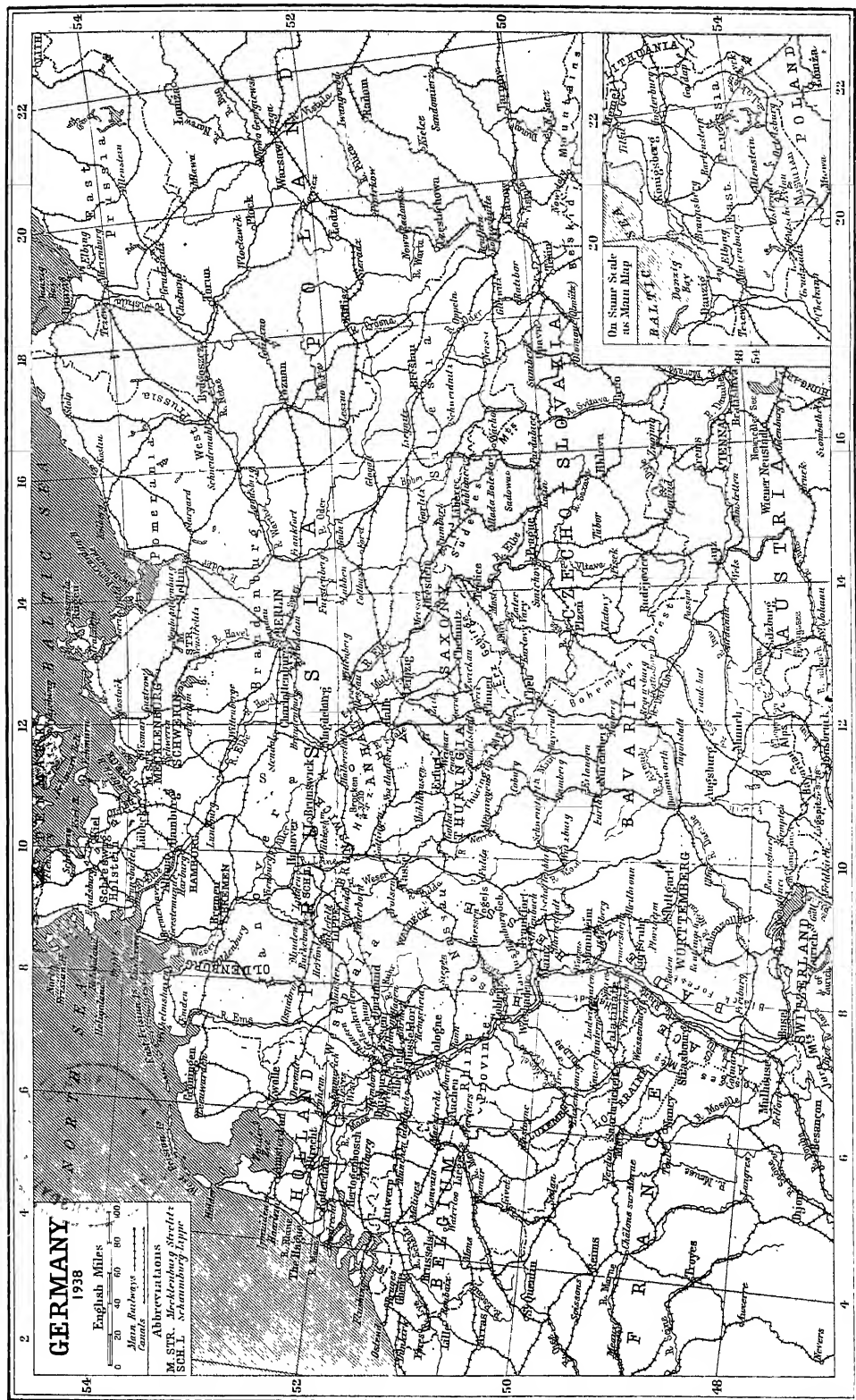
some Balkan people in the S., Slavonic in the E., and Teutonic only in parts of the N. Their outlook on life, behaviour to other nations, and what for simplification is called their militarism are the result of circumstances: teaching, example, and leadership. Given to a strong inferiority complex, the result of centuries of dismemberment and political powerlessness, the Germans, and in particular their Prussian overlords, have been inclined to overcompensate it by an aggressive attitude in periods of success and unity, however brought about. Forced to work hard on a densely populated, essentially poor soil, they are inclined to make discipline an end in itself, and fall an easy prey to superiors who abuse this inclination for their own ends.

**HISTORY.** Germany—Empire, or Kingdom, or Holy Roman Empire, as she was called at different times—had no centralised monarchy such as developed in France and England at an early period. Except for a few strong rulers who temporarily wielded supreme power, Germany was a federation of semi-independent regional rulers, frequently fighting with each other or against their imperial overlord.

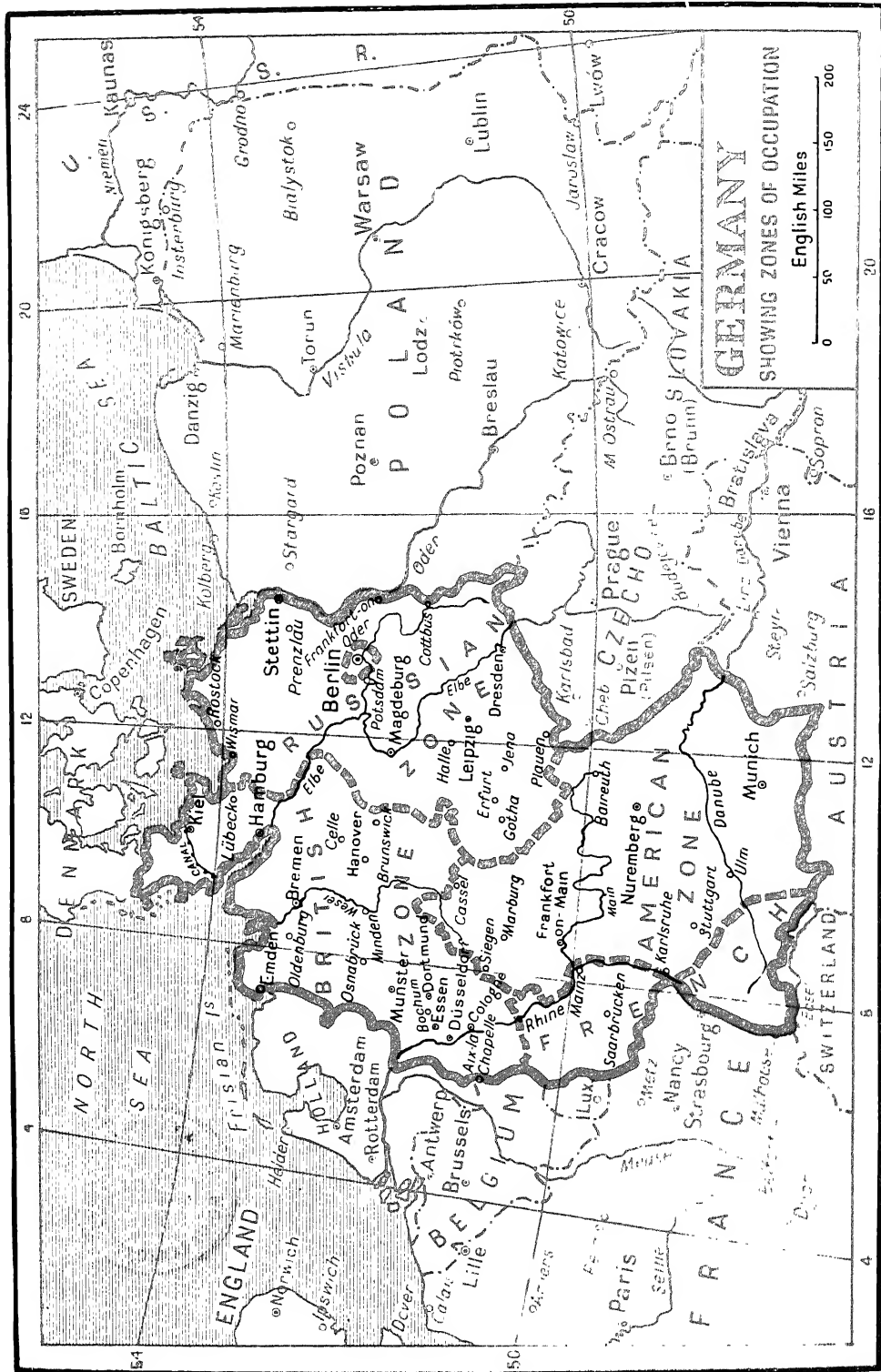
#### Early Trends

Three characteristics in particular account for the trend of her history from Carolingian days, when first those former Roman colonial outposts among wild tribes developed into some sort of a nation: (1) the old Teutonic custom of electing the ruler, in disregard of hereditary claims; (2) the contempt in which the ancestral tribes held the arts and industries of peace and the comforts of civilization, leaving agriculture and handicrafts to their women and slaves, and exalting warfare, hunting, drinking, and gambling; (3) the rivalry of the German kings and emperors with the popes for primacy within the Holy Roman Empire.

The first led to numerous civil wars between claimants to the German crown; the second to a comparatively late development of cities and urban culture; the third to centuries of campaigning in Italy which weakened Germany proper and the hold of its rulers over their own country. In consequence of the diversion of that interest came the frequent raids by neighbours—Norsemen on the coasts, Hungarians, Avars, and Slavonic peoples from E. and S.E., and, in later centuries, Frenchmen, Swedes, and Russians. So the German population, already in its



GERMANY: GENERAL MAP SHOWING BOUNDARIES BEFORE THE ANNEXATION OF AUSTRIA (MARCH, 1938) AND OF OTHER TERRITORIES



Note : a U.S. enclave surrounding Bremen, Bremerhaven, and Wesermünde, within the British zone, was transferred to British administration on Dec. 10, 1945, except for the actual ports, which the Americans retained until the end of military government in Sept., 1949. Berlin (a.v.) was divided into its own four occupation zones

ancestral composition including Slavonic, Celtic, and Dinaric elements, became a complex mixture, retaining its Teutonic character only in part of the N.W.

In the Palaeolithic period man lived in Germany, where the stone and bone implements that he used have been found. In the Neolithic age he was spread over a good deal of the country, this being proved by the discovery of his dwellings, implements, and graves. The Bronze age saw a marked increase in the civilizing agencies, and soon the people possessed chariots and other weapons, lived in strongly built houses, and knew something of the arts and refinements of life. To this they were helped by a trade with the Mediterranean regions. Such is the evidence of the soil and the spade; written evidence begins with the Romans.

#### Roman Settlements

After a first assault upon the Roman empire itself, by two migrating German tribes, the Cimbri and Teutones, at first victorious in S. Gaul, Spain, and N. Italy, and finally annihilated by Marius at Vercellae in 101 B.C., Rome soon started in turn the conquest of these unruly neighbours. In 55 B.C., the year he first landed in Britain, Julius Caesar crossed the Rhine in pursuit of retreating tribes, and conquered some of them; after his day began the military settlement of the Romans along the valleys of the Rhine and the Danube. After the defeat of Varus by Arminius in A.D. 9, these rivers were regarded as the boundaries of the empire, and camps were established along or near the two valleys. From these sprang many of the German cities of today, Cologne, Mainz, Cleves, Treves, Augsburg, Spire, and Worms; therein through the dark ages that followed there lingered traces of Roman civilization.

Now and again, in the early centuries, the Romans moved across from these rivers into Germany, but without achieving any real successes in the interior. Tacitus, in his *Germania*, names a large number of tribes in Germany, but most of these are names only, and in a century or two most had disappeared from history.

From one of these names came our word Germany. Julius Caesar referred to a group of tribes as Germani, and later Tacitus used the name, although for a different group. The latter author perpetuated it, moreover, in his invaluable work, and thus it became the Latin, and later the English, name

for the country. The Latin-speaking Germans of the monasteries, however, when their land was part of the Frankish empire, called it Francia, and later, as a single German speech came into existence, the word Deutsch was evolved. From this came Deutschland, although it was not generally used until the 15th century, this delay being due to the inclusion of Germany in the Holy Roman Empire with the sonorous description of its ruler as Emperor Romanorum.

Gradually, as in Britain, the Roman power grew weaker, and in the 3rd and 4th centuries the Romans were compelled to fight hard against tribes who refused to acknowledge their authority. Among these was the confederation known as the Alamanni, who carried the war on to Roman soil. From the east came an inrush of Huns, who swept across the land, and then with the appearance of the Franks the history of the land becomes a little clearer. From about 600, certain tribes or groups of tribes bearing familiar names appear, and a fairly continuous story can be traced.

#### Kingdom of Clovis

The chief of these tribes were the Franks, the Saxons, and the Bavarians. The Franks settled in both France and Germany, and the state they founded covered a considerable portion of each, a fact which does something to explain the long struggles for the possession of Alsace-Lorraine and the neighbourhood. Under Clovis, who died in 511, they became a kingdom, and this kingdom of the Franks grew into the empire of Charlemagne, the Frankish part of Germany being that lying along the Rhine, while its ruler had a more or less vague authority over other parts. In addition to this kingdom, Germany appears at this time to have been divided into Swabia, Saxony, Thuringia, and Bavaria, with an eastern portion inhabited by Slav tribes, some of whose names were perpetuated in Pomerania, Brandenburg, etc.

The kingdom of Clovis became that of the Merovingian kings of the Franks, under whose feeble rule the German tribes conquered by Clovis became again independent. Then followed the rise of Pepin of Heristal and the Carolingian family. Pepin and Charles Martel recovered the lost authority of the Franks over the Bavarians and the Thuringians, who were included in the great empire of Charlemagne.

Having become the king of the Franks, Charlemagne soon made

his rule effectual in western Germany, save only over the Saxons. A war with them was decided upon, and after a struggle lasting for about 30 years they were brought under his authority. He turned his arm also against the Slavs, who for many years had been troubling the eastern part of Germany.

#### Establishment of Christianity

Christianity in Germany, though introduced by the Romans in the border areas protected by the fortified line along Rhine and Danube, dates in the main from the missionary work of the Wessex priest Winfrith (680-755), later called Boniface and ordained bishop and archbishop of Germany by the Pope. With mostly English or Irish helpers, he converted the still heathen tribes, founding monasteries and churches in Bavaria, Thuringia, on the Rhine, and among the Frisians, among whom he was finally slain by a fanatic. Though at first much of the progress towards Christianity was superficial, and many of the converts were certainly only obeying the orders of a king when they were baptized, the monasteries and churches, which became centres of learning and civilizing and humanising agencies, were of incalculable benefit to the people.

Closely associated with this religious movement was the revival of learning. Much has been written about the scholars, Alcuin and others, whom Charlemagne gathered around him; while his love of learning was revealed in other ways. The revival which he encouraged produced a literature, almost wholly monastic, narrow in outlook, but yet of great value for the life of the age. Schools also, again solely under ecclesiastical influence, were founded.

About the social and economic life of the Germans at this time only generalisations are possible. Without stressing the frequently quoted remark of Tacitus about their hatred of town life, it is certain that the vast majority of them lived in the country. Trade was yet in its infancy, and the nearest approach to a town community was the group of dwellings housing its dependants that sprang up around a rich abbey, the palace of a king, or the seat of a bishop. There were settled the smiths who made weapons of war and of hunting, and a number of other skilled craftsmen whose work was of a more ornamental kind. But the tilling of the soil and the care of cattle were evidently the main occupations of the people.

The small communities in which the people lived were largely self-governing. Defence, one of their main considerations, had to be provided for, and there was probably some regular system of dividing the arable lands among the villagers or marksmen. In some way or other they contributed to the revenues of their chief or king; they were liable to be called upon to go and fight for him, and collectively they were responsible for the peace in their village. Force, tempered by custom, was the law under which they lived.

#### Division of Charlemagne's Empire

Soon after the death of Charlemagne, in 814, his great empire fell to pieces, and in 843 a most important arrangement was made between his grandsons. By a treaty signed at Verdun, the empire was divided, and that part which lay to the east of the Rhine, together with some smaller portions on the west, was given to Louis. Later generations labelled Louis the German, and although his kingdom was known as East France, it was really Germany, and he may fairly be called the first German king. He made Ratisbon his capital, and ruled over a good deal of what is now Germany, while his people had a vague idea that they formed a distinct unit in Europe. In 870, after the death of Lothair, a brother for whom the "middle kingdom" of Lotharingia had been created, Louis the German gained most of it by treaty with Charles the Bald of France.

Louis died in 876 and his kingdom soon fell to pieces. His son Charles the Fat inherited it as he did most of France proper, but he was unable to defend it from the attacks of the Magyars, invaders from the east, who had been kept in awe by Charlemagne. He was troubled, too, by the Northmen, or Danes, as the English called them; and, like Ethelred of Wessex, paid them to go away. At length the Germans, eager for security, deposed him, choosing in his stead his nephew Arnulf. Ranke describes this event, which took place at Tribur in 887, as "the first independent action of the German secular world." Arnulf, however, died a few years later, leaving only a boy to succeed him.

At this time the misery of Germany was extreme. Deep in the German mind was the idea that they had the right and the power to choose their king, and to this old expedient they now turned again. The prelates naturally took the lead, being educated, rich, and influential, and, with some of the secular nobles, they fixed upon Conrad,

a powerful man in Franconia, and in 911 they chose him as king.

By this time feudalism, or something like it, had appeared in Germany. Desiring protection, men had promised, in return therefor, their services to some powerful person in the neighbourhood, thus becoming his vassals. So appeared the beginnings of a hierarchy at the head of which was the king. Some of the reforms introduced by Charlemagne had been in the same direction, but it was in the years of disorder and danger that it made the greatest progress. In the various areas in which the people had the same speech sympathies, there was a tendency to look to one powerful man to lead the movement for defence, and he became the duke. Thus in Franconia, Bavaria, Saxony, Swabia, and Lorraine dukes appeared about this time, and they were sometimes strong enough to stand up to the king. They ruled over the duchies as independent kings, and this age is sometimes known as that of the great duchies.

About the same time, on the frontiers of Germany margraves were appointed to defend the borders or marches, and they too had great powers over the districts under them. Both Austria and Brandenburg, the parent of Prussia, were originally mark districts.

#### Reign of Otto the Great

Conrad's successor was Henry the Fowler, the first ruler of the Saxon house that supplied Germany with kings until 1024. He was chiefly concerned in looking after Saxony, and left the rulers of the other duchies very much to themselves, but there was a change when his son, Otto the Great, became king. A great man, inheriting certain advantages from his father, he was in reality the ruler of all Germany. It was one of the recurring periods when the barbarians were harassing the land, but Saxony was already safe, and it was near Augsburg, in S. Germany, that he won his great victory over the Magyars. All the duchies passed into his hands, or those of his nominees, and for once Germany had a king to whom there was no possible rival. In 962 he conferred a questionable benefit on the country by securing for himself the title and dignity of Roman emperor. He revived the empire of Charlemagne, and made Italy, and not Germany, the centre of interest for his successors. Otto II, and then Otto III, followed. Each left the Germans very much to themselves; in 1000, like the rest of Christendom, they believed the end of the world to be at hand.

In 1024 Henry II, the last ruler

of the Saxon house, died, and the electors chose another Franconian, called Conrad the Salian. He, like Henry the Fowler, was the first of a line, which endured until 1125. The chief event of this century was the struggle over investitures, that culminated in the appearance of Henry IV before Gregory VII, at Canossa, and ended in the concordat of Worms. The main importance of this contest, as far as Germany was concerned, was rather in the stimulus it gave to civil war and disorder. The pope found eager supporters in all those who disliked the rule or person of Henry IV. The Saxons were especially aroused against him, and there was a good deal of fighting in that duchy.

In 1138 there appeared as a candidate for the throne, vacant by the death of Lothair, Conrad of Hohenstaufen. He was elected, although not unanimously, for there was a rival candidate who was strong enough to take up arms, but in the end he prevailed, and his house ruled Germany until 1254. Conrad himself was a man of no great parts, but it was otherwise with his successors, Frederick I, and Frederick II.

Under the Hohenstaufen, the condition of Germany became very bad. It was fairly peaceful during the reign of Frederick I, who realized, as Otto the Great had done, that a king's first duty was to protect his people. He, however, spent German lives and German money freely in Italy, and the end of his reign was marked by the rebellion of his powerful vassal, Henry the Lion, of Saxony. Frederick was still strong enough to drive Henry into exile, and to break up his great duchy, which had been the foremost obstacle to a real royal authority since about 1124. Henry VI and Frederick II cared less for Germany.

#### Hohenstaufen and Welfs

When Henry died, in 1197, there was a struggle for the vacant throne, the opposing parties each choosing a king, and then taking up arms on his behalf. They were the Hohenstaufen and the Welfs, and the two kings, Philip from the former, and Otto from the latter, fought without a real decision for sixteen years. There was a chance of peace when Otto IV was crushed in 1214, but the ambition of Frederick II renewed the unrest. The quarrel with the pope gave the king's enemies in Germany a powerful weapon of offence, while the faction leaders also made good use, from their own point of view, of the enmity between Frederick and his son.

Frederick II died in 1250, the most brilliant personality among German rulers, though his interests centred chiefly on Italy. His son Conrad, beaten and disheartened, soon left Germany. The years 1254-73 are known as "the anarchy" or "the interregnum," during which even foreigners, like Richard, earl of Cornwall, set up as claimants to the throne.

No one had any real power, for at this time, apart from the court and surroundings of the king, there was no central authority. In this fact lay the mischief done by the continual expeditions to Italy. A regent or someone of the kind was left behind, but the machine he controlled was deprived of its principal parts. Thus came a chance for the ambitious among the princes and prelates. Civil wars were inevitable. The barons and their troops plundered wherever they could, causing an immense deal of suffering among the peasantry. Something of the kind happened in England and France, but to nothing like the same extent. Moreover, in those countries the hereditary character of the kingship made for stability.

The early part of this period was marked by the spread of Christianity; the latter by the growth of towns. Otto the Great especially believed in securing the aid of the Church, and about his time many bishoprics and monasteries were founded, mainly, but not solely, in the newly conquered regions. The energies of Christianity were also aroused by the Crusades, in which several German kings and many princes participated.

#### Trade and Townships

Other causes, the growth of trade being prominent, led to the increase in the number and size of the towns. As in England, kings found that selling privileges to them was an easy way of raising money. The general disorder added to their strength, for their walls were generally able to keep out the marauding bands, and the benefits secured by living therein were increasingly appreciated by the countrymen. Many of them were independent states in all but name, and the eagerness with which kings sought their aid is eloquent of their position at this time.

In general, during these years the size of Germany was being increased. There were set-backs, it is true, as towards the end of the 10th century, but notwithstanding this the gains were considerable. Henry the Fowler began the work of bringing the Slavs over his eastern frontiers into his duchy. Other kings carried on

Wars with Poles, Bohemians, Danes, and others, whose rulers now and again owned themselves as their vassals, but the important fact was not so much this as the steady roll of German influence eastwards. On the borders were watchful and ambitious men, lords of a piece of debatable land, small but capable of indefinite expansion by the sword. One mark district was extended until it became Brandenburg, while another area of expansion was in the south-east, Styria, Carinthia, and thereabouts. In 1250 the Elbe was far from being the boundary river it had been 300 years before.

#### Rise of the Hapsburgs

Under the conditions prevailing after 1250, it mattered little to the princes whether Germany had a king or not, but the pope was anxious for one, and at his instigation the electors met in 1273 and chose Rudolph of Hapsburg, a count ruling over some land in what is now Switzerland, and one who had made a reputation as a fighter. From this date until 1866, with only one long break, a member of this family was the senior of Germany's rulers, the one with the greatest prestige, though not always with the greatest power. The Hapsburgs were Roman emperors and German kings as long as the empire lasted; and as Austrian emperors were of high consequence in Germany until the events of 1866.

But Rudolph secured something intrinsically more valuable than the throne of a disunited country. The result of some fighting with the king of Bohemia, he took the duchies of Austria, Styria, and Carniola, and by giving these to his sons he began the long association of his family with the duchy that grew into the empire of Austria. When he died in 1298 his son Albert was not elected king, but he made war upon his successful rival, Adolph, who was killed in battle. Albert then secured the throne.

Albert's reign was brief, and when it ended there was another fight, this time between one of his sons, Frederick, and Louis, a member of the Wittelsbach family. The latter soon became the emperor Louis IV, another ruler who spent his strength freely, but without advantage to his country, in a quarrel with the pope. The next emperor, Charles IV, was a son of the king of Bohemia, and to him, also, though for a different reason, Germany was only a secondary consideration. Charles was followed by his son Wenceslaus, who was dethroned by the electors

because he was too idle to attend to his duties, and then came another son, Sigismund. On Sigismund's death in 1437 a Hapsburg was again chosen king, and the election soon became a mere form, a Hapsburg being chosen as a matter of course.

The emperor, however, was by no means the only ruler in Germany, nor was he necessarily its most powerful figure. From one end to the other were states, bewildering in number and of every conceivable size and shape, ruled by counts, marquesses, dukes, and some, not less important, by bishops and abbots. By virtue of the Golden Bull of 1356, which definitely established seven electors, these were winning an exceptional position, standing out amid the crowd of petty rulers. They were the king of Bohemia, the rulers of the Palatinate, Saxony, and Brandenburg, and the archbishops of Mainz, Cologne, and Treves. With Austria and Bavaria these were henceforth the chief of the German states, and much of Germany's history is that of their rivalries and growth.

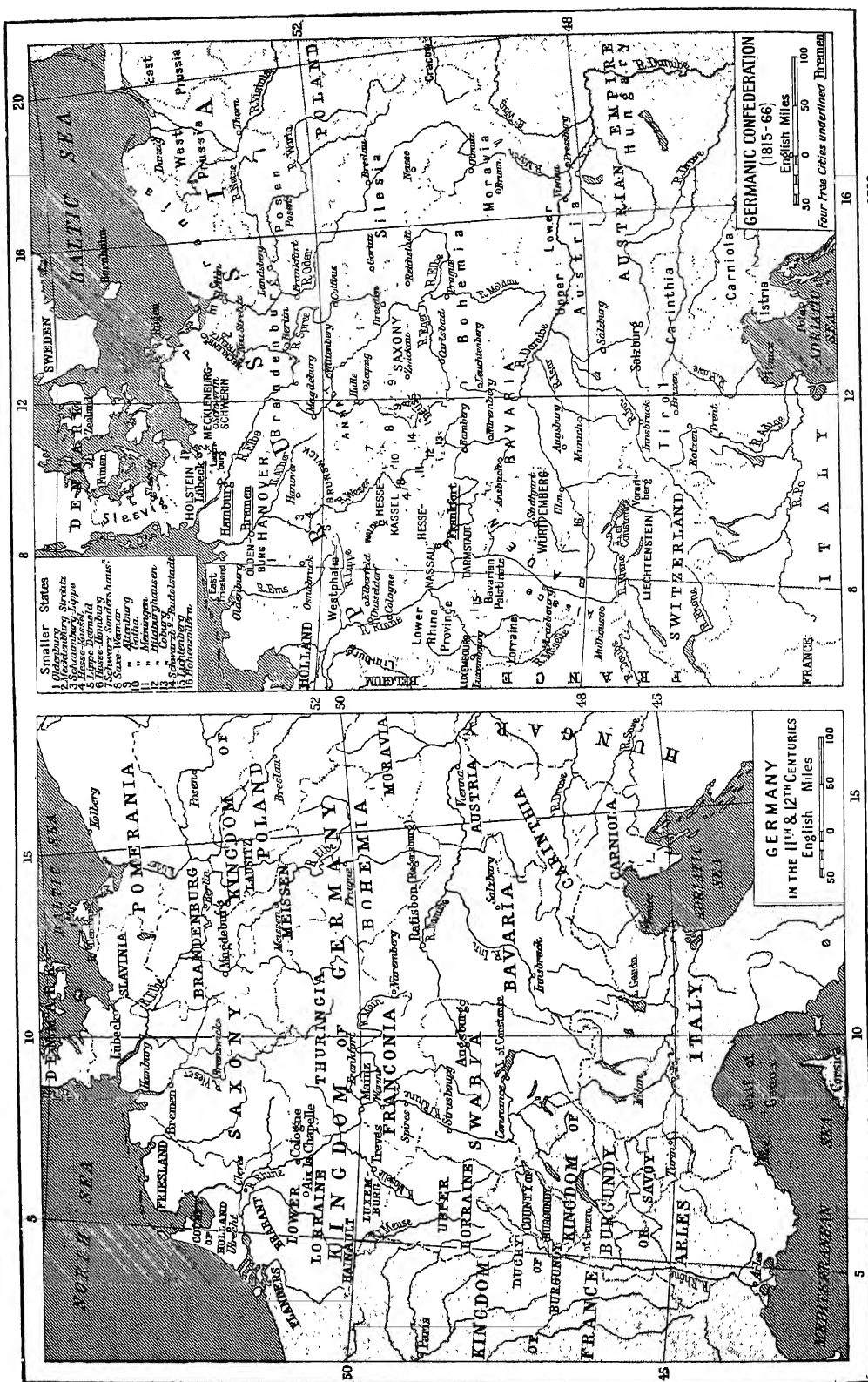
In Germany by this time something like a parliament had developed. Called the Reichstag, it met at the instance of the king in any city in which he was. At first, as in England, the members sat all together, but gradually they became divided into three houses, the college of electors, the college of princes, i.e. all the rulers save the electors, and the college of free cities.

#### The Hanseatic League

Two other movements should be mentioned—the Teutonic Order and the Hanseatic League. The knights of the former, the crusades being over and their occupation gone, accepted an invitation from the bishop of Prussia to help him to conquer the heathen Prussians. This the soldier monks did and the country, roughly the district now known as East Prussia, became the possession of the order, its ruler being the grand master. German immigrants settled in the land, and towns were built therein.

The Hanseatic League arose, c. 1200, from an association of German towns for mutual protection. There were a number of small alliances, which the conditions of the time almost compelled, but this one became unique as a trading confederation. It had its own fleet, and was strong enough to fight, as it did against Denmark for instance, but its main activities were commercial. It was independent of any German authority, save that the free cities owed a certain allegiance to the king, and





so was in practice a state within a state—*imperium in imperio*.

The long reign of Frederick III (1440-93) came to an end with the Middle Ages. The central authority was feebler than ever, while the Hohenzollerns in Brandenburg, the Wittelsbachs in the Palatinate and in Bavaria, and other rulers were making their states much larger and stronger.

#### The Renaissance and Reformation

The Renaissance and the Reformation, the movements that mark the end of the Middle Ages, had profound results in Germany. Maximilian, who became king in 1493, was a prince of the Renaissance type. Of his many activities, one was an attempt to improve the government of Germany as a whole. He divided the land into circles, each responsible for the maintenance of order within its own area, and this arrangement lasted, but in the larger sense his plans ended in failure, the vested interests being too strong for him.

Maximilian's failure compelled his successors to rely more, when force was needed, upon Austria, where their rule was effective, rather than upon the princes of Germany, who had axes of their own to grind, when troubles with foreign nations, especially France, arose. To make this separatist spirit more pronounced came the Reformation, with the cleavage of opinion that made Germany the most divided of all European states. Charles V was the most powerful ruler that Germany had seen since Charlemagne, but that was because he ruled over Spain and Spanish America, and was in close alliance with his brother Ferdinand, who owed to him the archduchy of Austria. The support which the princes gave him, both in his wars with France and in his efforts to settle the religious difficulties, was fitful indeed. The treachery of one of them, Maurice of Saxony, was sufficient to make this powerful potentate a prisoner.

The formation of a definite party, the Protestants, among princes and people, was followed by an outbreak of the peasantry, not in the main a religious movement. Many attempts were made to end the general unrest that continued after the peasants had been crushed, and a certain amount of success attended the religious peace of Augsburg, 1555. This adopted the principle that the religion of the prince must be the religion of the land. Numerically, towards the end of the 17th century, the Protestants were superior to the Roman Catholics. Not only were the former dominant in most

of the north, but they had a strong following in the rich cities of the south-west. Its two sections, however, were as bitterly opposed to each other as they were to the Roman Catholics. The Calvinists had no share in the benefits of the peace of Augsburg.

The Thirty Years' War was the inevitable outcome of the religious troubles. Charles V, and after him his brother Ferdinand and the latter's son Maximilian II, had made efforts to compose the religious and allied differences, but after a time the rulers began to display a less conciliatory spirit towards the Protestants. The counter-reformation began its work, and the Roman Church won back much that it had lost.

But something must be put down to a more material cause. One of the questions of the day concerned the ownership of the extensive lands that had belonged to the Church. Many of them had been seized by the Protestants, and about their possession strife was continuous, for the Roman Catholics demanded restoration. At length the year 1552 was selected as the dividing line; all that was then in Protestant hands was to remain so, all seized after then was to be returned.

#### Edict of Restitution

Just after the Thirty Years' War began Ferdinand II became emperor. This selection was the result of a family conclave. Young and vigorous, he was a contrast to his predecessors, Rudolph II and Matthias, while his training had made him anxious to crush rather than conciliate the Protestants. In 1629, flushed with victory, which, however, was only temporary, he issued the edict of restitution. This was intended to recover for the Church lands which she had lost through their rulers becoming Protestants, for a number of prelates had adopted the newer faith and, retaining everything, had simply been transformed from ecclesiastical into secular rulers.

The war lasted until 1648, by which time Germany had become a battlefield for nearly all the nations of Europe. It had been stripped bare by foreign soldiers; many towns had been plundered, and numberless villages had been destroyed; the population had been reduced probably by one half.

Between the peace of Westphalia of 1648 and the Napoleonic upheaval Germany was less of a united state than ever. The treaty granted toleration to the Calvinists equally with Roman Catholics and Lutherans, and so made peace on

this matter possible. But in another direction its results were less beneficial. The princes were free from now to form alliances with foreign powers, their states, especially the larger ones, thus becoming to all intents and purposes independent. The history of Germany becomes more than ever that of its parts.

#### The Wars with France

Internally, the cardinal fact of German history during the 17th and 18th centuries was the rise of Prussia; externally it was the series of wars against France. The latter began with the reign of Louis XIV, whose policy of enlarging France was made easier by the existence of Germany as a loose confederation of states. He persuaded or bribed some of the princes to fight for him, the visible results of his earlier wars being the acquisition of Alsace and Lorraine. The emperor did what he could in their defence, but he had two frontiers to protect, while the only force he could get came from his own Austria and from such princes as chose to help him.

This was even truer of the wars that opened with the accession of William III to the English throne in 1688 and ended with the treaty of Utrecht in 1714. France secured help from Bavaria, while the resistance to her policy came mainly from Austria and Britain.

The dominant figure in 18th century Germany is Frederick the Great. Steadily Prussia had emerged from the mark state of Brandenburg to one of the powers of Europe. In 1648, or soon afterwards, all Pomerania had been added, there were other acquisitions, and a century later Silesia was seized. Germany was divided into two armed camps, one supporting Prussia and the other Austria, and the contest between the two, ended temporarily in 1748, was fought out again in the Seven Years' War. Later there was some trouble about the succession to Bavaria, where the ruling family became extinct in 1777. This, however, passed to another branch of the Wittelsbach family, thus uniting the Palatinate with Bavaria.

#### The Revolutionary Wars

In 1789 the French Revolution began, and soon Austria, Prussia, and most of the other German states were drawn into the war against France. In the same period the two chief German countries were with Russia making an end, in their own interests, of Poland. In 1795 Prussia was compelled to give up her possessions on the left bank of the Rhine to France, and to withdraw from the war, but it

was continued by one or other, with Germany as the chief battleground.

In 1806 the emperor Francis II resigned the imperial crown, and the Holy Roman Empire came to an end. Germany was now in theory, what she had long been in practice, a geographical expression, while her master, one who carved her into pieces as he liked, was Bonaparte. In 1806 the Prussians were beaten at Jena, and in the years following a new spirit arose in that country, and to some extent in other parts of Germany. It resulted in a rising, the war of liberation, against Napoleon, and his final defeat at Waterloo.

Napoleon, in 1806, had formed a confederation of German states, the confederation of the Rhine, but a more lasting one came into being at the peace of 1814. This sealed and stamped a territorial revolution of the first magnitude, for the Germany of the Middle Ages, with its prince-bishops and the like, had finally disappeared. Most of the 300 states had vanished, so the boundaries of the others were altered beyond all recognition. Only 39 remained, and these formed the new German Confederation, or Bund. Austria and Prussia were its chief members; among the others were the kings of Bavaria, Hanover, Saxony, and Württemberg.

The history of the next fifty years is mainly a struggle for constitutional liberty. Several of the states had a landtag, or other assembly of nobles and prelates, but there was nothing in the way of representative institutions, nor had any government any idea of its responsibility to the people in the modern sense. The rulers fought hard against this movement, but it was too strong to be crushed. Saxe-Weimar leading the way, several rulers granted constitutions to their people.

#### The Frankfort Parliament

Another movement of the time was towards uniformity in commercial matters. Trade could never flourish in a country where import duties varied with each state, and where every few miles a new boundary with the inevitable custom house appeared. The first attempts led to the formation of three distinct trading areas, but soon these were united into the Zollverein of 1834. Austria stood outside this, making Prussian dominance easier. In 1848, as there had been to a lesser extent in 1830, there were revolutions throughout Germany. The passion for union was by no means satisfied with the association of 1814, and consequently a powerful

agitation compelled the Bundestag to agree to the meeting of a national parliament at Frankfort. The members, who were elected by a wide franchise, met to draw up a constitution for a united Germany. Having decided to have an emperor, they offered the honour to the king of Prussia, but he declined it, and as far as immediate results went the Frankfort parliament was a failure.

The duel between Austria and Prussia for the headship of Germany was now entering upon its final stage. In 1849 Prussia managed to form a union, but here she met with a rebuff; troubles in Hesse led to the entrance of Austrian and Prussian troops, called in by conflicting authorities. War seemed inevitable, but at the decisive moment Prussia gave way, and among other things the new union was dissolved. The terms of Austria's diplomatic victory were in the convention of Olmütz, and the Bund received new life.

#### Annexation of Slesvig-Holstein

Other attempts at a union followed, but meanwhile the Slesvig-Holstein question had dominated German politics. The war of 1850 against Denmark was waged nominally by the Bund, but in reality by Prussia, aided by some of the other states. This soon came to an end, but diplomacy continued its efforts at a settlement. In 1863, this not having been reached, the Bund again interfered; this time Saxony and Hanover took the lead, Prussia and Austria disapproving of their action. The two latter powers, however, fearing for their prestige, announced their intention of acting as independent states, invaded Denmark, crushed the Danes, and took over Slesvig and Holstein.

This gave Bismarck, Prussian chancellor, a pretext for war with Austria. The latter wanted the Bundestag to decide the future of the duchies. Prussia suggested a drastic reform of the confederation, from which Austria should be excluded. Both presented their suggestions to the federal diet, which accepted that of Austria. War was at once declared by Prussia, and on July 3, 1866, Austria was totally crushed at Sadowa. The majority of the German states, including Hanover, Saxony, and Bavaria, shared this humiliation, for they had fought against Prussia. The war ended the connexion of Austria with the other states of Germany and led to other changes, increasing Prussia's power and size. A new union was set up, the North German Confederation; its

head was the king of Prussia, and it included all the states N. of the Main.

The final step in the union of Germany followed the Franco-Prussian War. The Prussian army, this time aided, not opposed, by those of Bavaria and the other German states, again proved its prowess. In Jan., 1871, the North German Confederation gave way to the German empire, or Reich, with William I of Prussia as its first emperor. To this was given the federal constitution which, except for the disappearance of the emperor, it retained in the main after the revolution of 1918. The Reich consisted of 26 states, although one of these, Alsace-Lorraine, was not given equal privileges with the others. Save it, all were represented in the Bundestag, while the people sent their representatives to the Reichstag, but the affairs of the empire were mainly controlled by Prussia.

#### Policy of William II

The history of Germany from 1871 to 1914 was first a policy, that of Bismarck, of unifying the country on the Prussian model, and later that of William II, one of ambitious plans of world dominion that led to war. Under Bismarck a supreme court of justice was set up at Leipzig, and a common monetary system was established. Education was organized on Prussian lines, while under her control came most of the armies and the railways of the other German states.

William I died in 1888, and Bismarck resigned in 1890. William II had his chancellors, but he took a large share himself in the work of government. Socialism made great strides; for instance, at the general election of 1912 that party polled more votes than any other. More remarkable was the industrial progress of Germany.

The exact share of the emperor and his advisers in starting the First Great War, 1914, is perhaps doubtful, but it is certain that the German people heartily supported it, and that they believed they would win. They fought and endured well, though the peace proposals of Dec., 1916, showed something wrong. In Jan., 1918, there were risings in Hamburg, Munich, and elsewhere, but the collapse did not come until Oct. There was a revolution, almost bloodless; on Nov. 9 the emperor abdicated, and soon a republic was proclaimed. The other German rulers followed his example, and Germany became a federation of republics which was to endure until 1945.

**BETWEEN THE WARS.** On Oct. 3, 1918, when defeat had become a certainty and the despair of the masses reached danger point, Germany received her first parliamentary government, under Prince Max of Baden. It brought Socialists into the cabinet, and enforced the Kaiser's abdication, but could not prevent a revolution, which started by creating workers' and soldiers' councils on the Moscow pattern. But the Social Democrats found support from the bourgeois elements and what was left of the armed forces. A provisional government suppressed Spartacist (Communist) revolts by force.

#### Social Democrats in Power

The government arranged elections for a constituent assembly on Feb. 6. Socialists proved to be the strongest party, but needed the Democrats and the R.C. Centre in order to work against the opposing Independent Socialists, Conservatives, and Liberals. The primary duty of the first cabinet, under Scheidemann, with Ebert as provisional president of the republic, was to draw up a new constitution; this conferred all authority over finance, armed forces, and transport upon the Reich. Communist revolts were suppressed with bloodshed, while in Paris the foreign minister, Brockdorff-Rantzau, was confronted with the Versailles peace treaty. Over its terms the cabinet resigned, the Democrats refusing to sign. The signature was given on June 28 by the Socialist Müller and the Centre minister Bell. The national assembly moved from Weimar to Berlin, and the Democrats rejoined the cabinet.

Comparative calm was interrupted by the Kapp *putsch*, a seizure of Berlin by irregular armed forces on March 13, 1920. The members of the cabinet, however, escaped to Stuttgart; from there they frustrated the reactionary attempt by proclaiming a general strike. A Communist revolt in the Ruhr followed; because, in its suppression, German forces technically infringed upon armistice terms, French troops occupied Frankfurt. In S. Germany strong opposition to the trend towards Berlin centralism provoked friction, especially with Bavaria; in the Rhineland a separatist movement had the support of the French military authorities. Plebiscites prescribed in East and West Prussia, the Danish borderland, and Upper Silesia had brought, on the whole, results favourable for Germany, but clashes occurred in Silesia.

It is disputable how far the Allied reparations demands—reduced first from 226 to 132 milliards of gold marks, and subsequently reduced still further by the Dawes and Young plans contributed to German inflation and decay of the currency. At the end of 1923 a new currency (Rentenmark), based upon a state imposition on all immovables, stabilised the flood of paper money at the rate of 1 Rm. for 1,000,000 millions of the old marks. The complete loss of titles in the old currency inflicted upon people living on annuities, savings, and former investments, made it necessary to revalue their claims. Apart from deliveries in kind—coal, timber, chemicals—for which the Reich had to indemnify the industries engaged in fulfilling reparation demands, on top of such payments in gold and foreign currency as it discharged, came the "passive resistance," which was the German government's answer to the French occupation of the Ruhr valley, to complete the breakdown of the financial structure.

#### France Occupies the Ruhr

The French premier, Poincaré, occupied the Ruhr as a reprisal for Germany's failure to fulfil her economic and financial obligations. Great Britain refused participation, and the U.S.A. withdrew its forces from German soil. A general strike of the Ruhr workers, acts of sabotage, the creation of a customs frontier by the French, new proposals for settlement from Berlin, all failed to bring about a solution.

Thereupon the leader of the Liberals, Gustav Stresemann, hitherto in opposition, undertook the formation of a new coalition government and, as chancellor, negotiated a capitulation and, with the French Radical, Edouard Herriot, and the British Socialist, Ramsay MacDonald, a compromise over future reparations payments, July–Aug., 1924. A Right-wing coalition followed after elections in Dec., but Stresemann remained, in this and all governments until his death in 1929, foreign minister and the dominating figure.

Stresemann's suggestion of a Rhine pact, a reciprocal guarantee of frontiers, succeeded in Oct., 1925, at the Locarno conference (*q.v.*). In the wake of this understanding, a number of restrictions were lifted from the Rhineland. Allied military commissions were withdrawn, and in Sept., 1926, Germany was received into the League of Nations at Geneva in a generally hopeful atmosphere.

Yet all this served to accentuate reactionary and nationalist trends negligible under the previous conditions of general distress. Illegal military or pseudo-military organizations, responsible for political assassinations, *e.g.* of the former finance minister Erzberger, the Bavarian premier Eisner, the foreign minister Rathenau, created trouble at home and with foreign countries. A *putsch* in Munich on Nov. 9, 1923 by a wildly anti-democratic and anti-Semitic party led by Adolf Hitler had to be suppressed with bloodshed. The election, after President Ebert's premature death on Feb. 28, 1925, of the former Field Marshal von Hindenburg as president did not contribute to conciliation.

#### Berlin Treaty of 1926

At Genoa, in 1922, Rathenau had concluded the Rapallo treaty with the Soviet Union, re-establishing diplomatic relations and cancelling all reciprocal war claims. After Locarno there followed the Berlin treaty of 1926, securing reciprocal neutrality as to Germany and Russia in the event of war with a third power.

In 1929 Germany applied once more for a modification of the reparations terms. Granted after two Hague conferences, it was publicly repudiated by Hjalmar Schacht, head of the Reichsbank. This action led to the first official combination of the *Deutschnationale* (Conservative) and the National Socialist (Nazi) parties. Heinrich Brüning, as chancellor, tried to continue his work but, under the blows of the world economic crisis, had to ask for a moratorium on all reparations payments, secured with the U.S. president Hoover's help in 1931. Unemployment rose rapidly; cuts in public expenditure and wages did not alleviate the burden.

At the next election, Sept. 14, 1932, the Social Democrats gained 143 seats, and the Nazis increased their Reichstag membership from 12 to 107. The government tried to govern by decrees; but two further elections merely increased the opposition. After semi-dictatorial Right-wing experiments under Franz von Papen and Kurt von Schleicher as chancellors, at a time when nearly one-third of Germany's working population was living on the dole, Hindenburg was persuaded to charge Hitler, who now had 196 followers in the Reichstag out of 584, with the formation of a government, mainly on his own terms, Jan. 30, 1933 (*see* National Socialism).

**GERMANY UNDER HITLER.** On Feb. 27 a gang of Nazi leaders and tools set fire to the Reichstag, upon which Hermann Goering, its speaker and Hitler's chief lieutenant, accused Communists of this and other misdeeds, and a huge bogus trial was staged at Leipzig. Hitler's government, meant to be a coalition, was turned into a dictatorship by a largely falsified election on March 5, which gave the Nazis 288 seats out of 647, reduced to 566 by the cancellation of 81 Communist seats. There were mass arrests of Left-wing politicians and officials. The Nazi aims henceforth were ruthlessly pursued: abolition of all Versailles restrictions; rearmament; recovery of lost territories; conquest of "living space" at Russia's expense; and, finally, world domination.

#### Hitler Chief of the State

Unemployment was abolished by a planned economy, mainly or wholly devoted to gigantic armament works and other warlike preparations. Opposition was quashed by concentration camps and mass murder, e.g. on June 30, 1934, of Schleicher and others. The death on Aug. 2 of the senile Hindenburg was exploited to make Hitler simultaneously chief of the State and head of the government. In Sept. Germany left the League of Nations; on March 16, 1935, Hitler abolished the Versailles restrictions upon the size and armament of German forces; on March 7, 1936, his troops re-occupied the Rhineland, demilitarised for ever under the peace treaties. That year, together with Mussolini, he sent troops and squadrons of his newly created air force to Spain, to fight with General Franco's Nationalists against the Republicans.

After having instigated a frustrated *putsch* in Vienna, during which the Austrian chancellor Dollfuss was murdered on July 25, 1934, Germany enforced the *Anschluss* with Austria by military occupation, March 11-12, 1938.

The German people were persuaded or convinced of Hitler's superiority and luck, or silenced by coercion, concentration camps, torture, Gestapo terrorism, and death. They were strengthened in this attitude by the Munich agreement of Sept. 29, 1938, by which Great Britain and France, with Mussolini's concurrence, allowed Hitler to mutilate Czecho-Slovakia, after threatening war. The subsequent violation of this agreement by the occupation of the whole

country on March 15, 1939, ended the period of "appeasement." A week later Hitler annexed Memel.

Pledges were given by Great Britain and France to Poland, Rumania, and such other neighbours of Germany as did not still rely on their neutrality in a coming war. British negotiations with Moscow were opened but frustrated by a clever stroke by Hitler, in the form of the Ribbentrop-Molotov pact of neutrality, Aug. 23. Germany embarked on Sept. 1, 1939, upon the Second Great War by annexing Danzig and invading Poland.

#### Edgar Stern-Rubarth

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**LANGUAGE.** The language spoken by the greater part of the inhabitants of the former German Empire, and by the Germans of Austria and Switzerland, is known as High

divided into two main dialects: Bavarian, which includes German Austrian, E. of the river Lech; Alamannic, including Swabian, Alsatian, and Swiss, W. of that boundary, and Upper Franconian to the N. The line of demarcation between High German and Low German runs approximately from Maestricht to Düsseldorf, then, after a slight curve to the S., through Minden, Magdeburg, Wittenberg, Lübben, and Fürstenberg. Low German includes Lower Franconian, which developed into modern Dutch and Flemish, and the Saxon dialects (Westphalian, Low Saxon, etc.); these continue to exist in the form of various so-called Plattdeutsch dialects.

#### Middle High German

Old High German is a richly inflected speech with full endings, and a wide range of vowel sounds. In the course of the 11th century, this dialect gave place to Middle High German. The flexional endings were reduced to a more or less uniform e-sound; and the simplification of the language brought with it a syntax to a greater extent dependent on word position.

Middle High German was the language of Germany from the 11th to well into the 15th century, and passed gradually into New High German or Modern German, the principal changes which mark the transition being a lengthening of short vowels in open positions, e.g. *grāp* to *Grāb*; *lēben* to *lēben*; a reduction of certain diphthongs to monophthongs, as *guot* to *gut*:

*Ar. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.*  
A A B b C c D d E e F f G g H h I i J j K k L l M m  
N n O o P p Q q R r S s T t U u V v W w X x Y y Z z

German Language. Script forms of the 26 characters in the German alphabet, the capitals and small letters side by side with corresponding Roman type capitals and small letters beneath each pair

German, and forms a branch of the Germanic, or Teutonic, family of Indo-European languages. The separation of High German, that is to say, the speech of the "high" lands of the S. from the parent stock, probably took place in the 7th century, and was marked by a change in the consonantal system, known as soundshifting, or, in English, as Grimm's Law (*q.v.*). This change is exemplified by the consonants in such cognate words as the English *ten*, German *zehn*; English *do*, German *tun*.

The first period of the development of High German, known as Old High German, lasted from approximately 600 to 1050. The principal dialects were Upper German,

dienen to *dienen* (ie pronounced ee); also the reversal of the process in *zit* to *zeit*, *mūs* to *Maus*, *hiute* (where it is pronounced like modern *ü*) to *heute*.

Uniformity in High German speech was brought about by three factors: the union of the German states under the medieval empire, which necessitated a generally understood language for government purposes; the invention of printing, which made it desirable that books should appeal to as wide a public as possible; and, most important of all, the influence of Luther's Bible, which was translated into a carefully selected language representing a compromise between N. and S. Thus the

spread of a uniform literary High German language was largely dependent on the spread of the Reformation itself. In the 17th century, High German deteriorated seriously, owing to the promiscuous introduction of foreign words.

While the German language has changed little since the time of Goethe and Schiller, German style has undergone considerable development in the direction of flexibility and clearness; and successive legislation in the German-speaking states has brought about a uniform system of orthography. An effort has also been made throughout Germany, Austria, and Switzerland to maintain the purity and uniformity of German pronunciation by means of a fixed standard in the language of the stage. The claims of the dialects for serious recognition, however, make themselves still heard, not merely in the N., but also in the southern states, especially in Bavaria and Austria.

**LITERATURE.** The literature of the earliest or Old High German period calls for little comment, its interest being mainly linguistic. The chief monuments are a gospel-harmony in verse by Otfrid of Weissenburg, a ballad, *Das Ludwigslied*, and voluminous glosses and translations by Notker Labeo, a monk of St. Gall, indeed, the most interesting documents of the 9th century are not High, but Low German—namely, the fragmentary alliterative ballad, *Das Hildebrandslied*, and an old Saxon epic of the Life of Christ, *Der Heliand*, or *The Saviour*. In the 10th century, under the Saxon emperors, the vernacular fell into disfavour, and such literature as there was, the Lay of Waltharius, *Ruodlieb*, a forerunner of medieval romance, *Ecbasis captivi*, an early form of the Beast saga, and the plays of Roswitha, a nun of Gandersheim, were written in Latin.

#### French Influence

In the 11th century, when the Middle High German period opens, literature, hampered by the ascetic spirit of the Church, made at first slow progress; but French influence soon found its way across the Rhine. Before the 12th century was half over the Germans were acquainted with the Song of Roland, the epic of Tristan, and had themselves, under Provençal stimulus, begun to cultivate a lyric poetry or Minnesang, of wonderful freshness and purity. By the end of the 12th century Middle High German poetry had reached its zenith. In the courtly epic, Heinrich von Veldeke, author of the *Eneid*, had given place to Hart-

mann von Aue, Wolfram von Eschenbach, and Gottfried von Strassburg. To the first we owe versions of the French romances of Erec and Iwein, the legend of Gregorius, and that most charming of Middle High German idylls, *Der arme Heinrich*; to Wolfram a German romance of Parzival which transcends all others in mystic depth and romantic suggestiveness, and to Gottfried a German Tristan which gives rein to the emotional paganism of the Middle Ages.

More peculiarly German is the great epic *Das Nibelungenlied*—not unworthily described as the German Iliad—which unrolls with relentless tragic power the story of Siegfried's death and Kriemhild's revenge. Another epic, Gudrun, more loosely constructed but of gentler beauty, deals with sagas of the North Sea; others, of varying merit, constitute the so-called *Heldenbuch*.

#### Literature in the Middle Ages

The glory of Middle High German literature is Walther von der Vogelweide, the greatest lyric poet of the Middle Ages. Walther's strength lies not solely in the unrivalled beauty of his love songs, but in the width of his range; he is not merely a minnesinger, but also a political poet. All this remarkable outburst of poetry dates from the last years of the 12th and the first two decades of the 13th centuries. Thereafter Middle High German literature fell into diffuse imitation and degenerated rapidly. Of the later poets, Konrad von Würzburg, who cultivated the epic, and Neidhart von Reuenthal, a lyric poet, are the most eminent.

A period of confused and ineffectual literary effort now set in, in which old forms and new ideas jostled together. On the one hand the Germans gave themselves up to mysticism and allegory; on the other they imitated the incisive and witty literature of the humanists, from whom they also learned the art of translation. But there is little originality until the end of the 15th century, when two outstanding works appeared, *Das Narrenschiff*, by Sebastian Brandt, which foreshadowed the coming Reformation, and the Low German beast epic, *Reynke de Vos* or *Reynard the Fox*. The 16th century is the century of the Reformation. Martin Luther himself is its chief man of letters; his translation of the Bible is the greatest German book of the century, and his hymns are its most characteristic lyric expression. Under his influence the drama sprang into new life; at first restricting itself to Biblical themes, but later drawing freely

on the wealth of story liberated by the Renaissance. A typical German dramatist of the 16th century is Hans Sachs, the cobbler of Nuremberg, who especially excelled in the comic *Fastnachtspiele* or Shrovetide plays; and in his hands also the *Meistergesang* flourished, a form of poetry which took the place of the medieval Minnesang. The 16th century was also the great age of German Volkslied.

#### 17th and 18th Centuries

Besides the drama, the most virile form of literature was satire, which with the grim Catholic monk, Thomas Murner, attained a fierceness and brutality without example in any other period. Later in the century Johann Fischart, an Alsatian, led German prose into lines of Rabelaisian extravagance, without an adequate substitute for Rabelais' humour. The promise of the 16th century was not fulfilled, for in the 17th Germany was devastated by the Thirty Years' War. Literature fell almost exclusively into the hands of learned poets like Martin Opitz, Paul Fleming, Simon Dach, and Andreas Gryphius, who sought to impose on the Germans a rule-bound literature on strictly classic lines. The literary spirit of the nation is to be found not here, but in its religious poetry, above all, in the hymns of Paul Gerhardt, and in Grimmelshausen's romance *Simplicissimus*, which held the mirror up to the long war with relentless realism. The peace of Westphalia (1648) left Germany exhausted, and the literature of the later 17th century consists mainly in imitations of the French gallant novel, and in bombastic verse which reduces to absurdity the "preciosity" of Marini and Guarini.

At the opening of the 18th century an endeavour to introduce a classic taste in accordance with the tenets of Boileau was apparent. The chief representative of this movement was J. C. Gottsched, the literary dictator of Leipzig, whose *Kritische Dichtkunst* appeared in 1730. But this pseudo-classicism soon found itself in conflict with new doctrines more in harmony with nature, which had found their way to Germany from England. With the conflict in 1740 between the champions of these ideas, the Swiss critics, J. J. Bodmer and J. J. Breitinger, and Gottsched, the new era may be said to open. C. F. Gellert, who won great popularity with fables in the style of La Fontaine, introduced the *comédie larmoyante* from France and the Richardsonian novel from England, and, in 1748, F. G. Klopstock published the first cantos of



Der Messias, a religious epic inspired by Milton. Even more significant was Klopstock's lyric poetry, which broke the fetters that had so long hampered the German lyric.

Meanwhile, in S. Germany, C. M. Wieland contributed to the liberation of German letters with poetry in the spirit of Ariosto, with psychological fiction and a translation of Shakespeare; while another and greater writer, G. E. Lessing, inaugurated the classic age in German literature. With his *Miss Sara Sampson*, Lessing introduced into Germany the tragedy of common life, with Emilia Galotti he perfected this type of drama, and with *Minna von Barnhelm* he gave Germany's 18th century literature its greatest comedy. As a critic, Lessing stands in the first rank.

#### Influence of Lessing

His *Laokoon*, which prescribes the boundaries between plastic art and poetry, and his *Hamburgische Dramaturgie*, which interprets the modern drama by the light of Aristotle, were text-books which profoundly influenced subsequent developments in Germany and in Europe. Lessing's later years were overshadowed by his battle for tolerance and enlightenment with the Lutheran clergy, a conflict which left an enduring monument in the drama *Nathan der Weise*.

Before Lessing's career had reached its close another movement, the so-called Sturm und Drang or Storm and Stress, had broken over Germany, which was immediately inspired by Rousseau and continued the emancipatory work begun by Klopstock. Its pioneer was J. G. Herder, a thinker of prophetically modern sympathies, and at his hands J. W. von Goethe was initiated into the new ideas. Goethe's *Götz von Berlichingen* and Werthers *Leiden* were the chief works of the Sturm und Drang. A number of gifted, if unbalanced, young dramatists gathered round Goethe, J. M. R. Lenz, F. M. Klinger, H. L. Wagner; and in 1781 J. C. F. Schiller made his début with his tragedy, *Die Räuber*, to which were added a few years later *Fiesco* and *Kabale und Liebe*.

The culminating phase of 18th century classicism is symbolised by the close friendship of the two leading poets in Weimar between 1794 and Schiller's death in 1805. In these years Schiller wrote his ballads and his magnificent series of dramas from *Wallenstein* to *Wilhelm Tell*; Goethe published *Wilhelm Meisters Lehrjahre* and *Hermann und Dorothea*, while the

first part of *Faust* followed in 1808. The minor literature of the time reflects more or less faithfully the return to classicism, although in the popular stage plays, notably by Iffland, Schröder, and Kotzebue, and in the novels of J. P. F. Richter, the old Sturm und Drang spirit is still in evidence.

Goethe, who died in 1832, was the acknowledged head of this literature, his chief contributions to it after 1808 being, in lyric poetry, *Der Westöstliche Divan*; in fiction, *Die Wahlverwandtschaften* and *Wilhelm Meisters Wanderjahre*, to which may be added his autobiography, *Dichtung und Wahrheit*, and, in the drama, the second part of *Faust*. But in this period the dominating force in German literature was not classicism but romanticism. The Romantic Movement falls into four clearly marked phases: the first is that of the so-called Romantic School, founded in 1708 and led by J. L. Tieck, Novalis, and the brothers Schlegel; the second, which is associated with Heidelberg, encouraged, under the leadership of L. A. von Arnim and C. Brentano, the study of the Middle Ages and of the literature of the people; a third phase, to which belonged the lyric poets J. von Eichendorff, A. von Chamisso, and W. Müller, had its centre in Berlin, and effectually broadened the basis of romanticism; a final period of romantic decay includes the morbid supernaturalism of E. T. A. Hoffmann and the Orientalism of F. Rückert.

#### Heine and His School

To the last phase of romanticism belongs one poet of supreme genius, Heinrich Heine; but Heine at an early stage declared his sympathies with the school of "Young Germany." This school, whose leaders were, besides Heine, Ludwig Börne and Karl Gutzkow, was essentially anti-romantic; under its protection journalism encroached on literature, and political idea took the place of poetic sentiment. The Young German lyric reflected the revolutionary spirit between 1830 and 1848; its novel, as represented by Gutzkow and later by F. Spielhagen, G. Freytag, and the Plattdeutsch writer, F. Reuter, busied itself with social problems. Meanwhile the Germans were also cultivating assiduously the short story: B. Auerbach with his *Schwarzwälder Dorfgeschichten*, T. Storm with his tales of romantic retrospect, Paul Heyse with his finely chiselled style and Italian sympathies, and the two Swiss masters of fiction, G. Keller

and C. F. Meyer, have won for the German short story a high place in European fiction.

Although to a large extent overshadowed by Schiller, the German drama struck out, under romantic influence, into new paths, the chief representatives being H. von Kleist in Prussia, and F. Grillparzer, the national dramatic poet of Austria. To the post-romantic epoch belong O. Ludwig and F. Hebbel, the latter one of the most original dramatic poets of the 19th century. After the revolution of 1848 German literature, like German political life, passed into a period of comparative stagnation; but just in these years German scholarship, and especially German historical study, the latter under the leadership of L. von Ranke, were extraordinarily productive. The most interesting literary work emanated from a group of writers in Munich, and with Munich also was associated Wagner, whose music dramas helped to revive an interest in theatre and drama.

#### Literary Influences from Abroad

As the century drew to its close the Germans, always sensitive to outside influences, absorbed the literary ideas in vogue in France, Russia, and Scandinavia, and under this stimulus cultivated the naturalistic novel and the drama of *milieu*. The great success was attained by the drama, whose chief representatives were H. Sudermann and G. Hauptmann; while in lyric poetry men like D. von Liliencron and R. Dehmel, in the epic, the Swiss, C. Spitteler, broke effectively with the old romantic tradition. The outstanding personality of the last epoch was F. Nietzsche, who was not merely a thinker of powerful originality, but also a lyric poet of genius. It has been claimed with some justice that his ideas, working on immature minds, helped to precipitate the catastrophe of 1914.

#### J. G. Robertson

The beginning of the 20th century, with its trend towards social criticism, favoured the entry of women into the world of German writing. Gabriele Reuter, Helene Böhlau, Clara Viebig, and Ricarda Huch rank among the best novelists of the early 20th century. Ellen Key was a precursor of the later psycho-analytical school, which developed simultaneously with that of the *Heimatkunst*, the art of catching the spirit of the author's particular district. The Austrian R. H. Bartsch, the Prussian T. Fontane, the Frisian G. Frenssen, the Rhinelander J.

von Lauff, are outstanding among that large group.

It was superseded, during and after the First Great War, by a neo-romantic school, with a historical offshoot: B. von Münchhausen's ballads, H. Eulenberg's short stories, P. Scheerbart's and G. Meyrink's Wellsian fantasies, E. von Keyserling's novels, typify that trend. In poetry, it is reflected to a varying degree by R. M. Rilke, H. von Hofmannsthal, and S. George, though a perfecting of form and style has led to their being called neo-classics.

#### The Modern German Novel

But the term neo-romantic is justified for the masters of the modern German novel, whose purpose, apart from pure art, is a profound criticism of the author himself and of his time. Supreme among them, possibly one of the greatest figures of German thought and literature of all time, was Thomas Mann. Jacob Wassermann, the Austrian Arthur Schnitzler, later Arnold Zweig and Bruno Frank, deserve high praise. As dramatists F. Wedekind, Schnitzler, his fellow-countryman H. Bahr, G. Kaiser, and the Radical Ernst Toller, created a lasting impression. While fertile in talent deserving temporary success, as seen in the verse of worker-poets and the war novels of E. M. Remarque and others, the republican period of 1919-33 produced no new genius.

The Nazi period was sterile. What William II had in vain endeavoured to provoke by bribing art and literature, a style that would glorify his dynasty, that Hitler and his minions tried to produce by dictation and force. This proved an utter failure, drove men like Mann, Zweig, Frank, Werfel, and Feuchtwanger into exile, and the few remaining authors and poets to mendacity, and finally needed a grotesque exaltation of inferior Nazi diletanti to fill the academies and learned societies. Meanwhile the Nazis exploited authors, historians, and philosophers of the past, like Fichte and Treitschke, by extracting from their work such parts as gave an interpretation advocating racialism and militarism. Nor did the first period after the Nazi collapse favour the resurrection of German writing. No new names were forthcoming, and the well-known authors mostly stayed in the lands of their adoption.

ART. Though Teutonic art in its origin and for long afterwards lacked both spontaneity and vol-

ume, the earliest artists were also the greatest. The art instinct of the people went out, copiously and gloriously, towards the material and tangible, and in the design of cathedrals, town halls, and private houses, and the carving of wood and stone, showed consummate skill. Medieval German architects worth mentioning are Erwin von Steinbach, architect of Strasbourg cathedral, Joerg Gangofer, builder of Munich cathedral, and Hans Stettheimer, who designed many S. German churches. So are the unknown sculptors of the Bamberg horseman and of the Naumburg statues.

Opulent burgomasters and merchants, by no means averse from pomp and ostentation, had neither the knowledge nor the taste to encourage painters, who had to look for patronage in the main to the Church, as at Cologne, and to the wise munificence of an occasional emperor. Purely native effort soon spent itself, and the painters, to some extent distrustful of themselves, had the sense willingly to submit to the formative influence of foreign schools, first of the Netherlands, next to Venice and Italy, and lastly of France.

#### Dürer and Holbein

In the beginning their work was violent in colour, and realism was apt to be overdone and coarse. In portraits and single figures and limited groups they were quick to seize character, but regarded strength rather than beauty, and the dominant note was marked individuality. The men of genius were rare and their achievement but served to illuminate the comparative sterility of their fellows. Throughout the period ending with Adam Elsheimer (1578-1628), when Italian influence became predominant for a century, only four names can be said to be household words: Albert Dürer, Hans Holbein the Younger, Grünewald, and Lucas Cranach.

Dürer was a man of almost as universal accomplishment as was Leonardo da Vinci, though he missed the latter's suavity, refinement, and sense of colour. His portraits of himself and of Hieronymus Holzschuher are marvels of technique, while his drawings for wood and metal are the theme of undiminished admiration. Holbein's power, preserved in such pictures as the Madonna painted for Jacob Meyer, burgomaster of Basel, and his portraits of George Gisze, a merchant of the London Steel-yard and of Christina Sforza,

duchess of Milan, purchased in 1909 for £72,000 and presented to the British nation, ran on more gracious lines. To these it will suffice to add the Madonna with the Violet, by Stephen Lochner (c. 1400-50), the first truly tender and charming figure painted in Germany, and the Holy Family at the Fountain, by Albert Altdorfer (c. 1480-1538), greatest of the "Little Masters." Where the sculptors were many and distinguished it may be unfair to particularise, but the work of Adam Krafft (c. 1455-1507) and Peter Vischer (1455-1529) may be mentioned.

#### Effect of the Thirty Years' War

Italian influence—the influence of an Italy, too, whose prime was past—was established early in the 17th century. The incompatibility of the southern and northern temperament foredoomed their projected union to failure, but another and overwhelming disaster befell German art, which was paralysed for generations by the ruin, misery, and demoralisation consequent on the Thirty Years' War (1618-48).

However, in spite of the appalling results of the political turmoil and dynastic squabbles, the friends of the Italo-Teutonic alliance maintained their foolish advocacy. Winckelmann's laudation of the art of the ancients (1764) was so far mischievous that it led to blind faith in the classical as art's be-all and end-all, and those who espoused his teaching diverted German artists from thoughts of the present and more especially, the future. Lessing continued the parable, and landscape and genre were for a time despised. Beauty was everything, Nature nothing. Even Goethe joined the reactionaries. "Art," he said, "has been written in Greek, not in German."

But to all save its devotees classicism was as sawdust. It suffered a natural death, giving place to the monkish asceticism of the Nazarenes—a nickname of reproach which they proudly adopted as a happy designation of their coterie—whose prophet was Wackenroder (1773-98), whose cult was that of the Madonna, and to whom a picture-gallery was as a temple of Christian worship, the very gate of Heaven. The leading exponents of their art creed were Peter Cornelius, Frederick Overbeck, William Schadow, Philip Veit, Schnorr, and Edward Steidle.

They gave themselves away as artists when they relinquished drawing from the model as an

injury to idealism and from the nude as a menace to modesty. For the rest, the art-loving public grew weary of anaemic scriptural pictures and didactic or nambypamby anecdotes—excellent in design, but poor in colour and wholly destitute of vigour—and with avidity went after the strange gods to the west of the Rhine. Nor did the Romanticists, who sought inspiration from the Old Testament or Shakespeare and the poets, fare any better. The promise that underlay the monumentalism of Alfred Rethel (1816–59) was cut short by madness, and though Moritz Schwind (1804–71) got more out of legend and fairy tale, which he saw with the eye of a modern, than all the other Romanticists combined, that way salvation did not lie.

If the art of sentimental Germany lacked essential truth because it was non-human, the art of the Germany of blood and iron, by which it was succeeded, developed remarkable technical qualities, and several painters of the first rank, who had the courage to rend the shackles which had bound their fathers and colleagues, frankly going to the *ateliers* of Paris for what the Frenchmen could teach and they learn. Concerning the Exposition of 1855 Edmond About had said truly and wittily "If you meet with a good German painter you can compliment him in French."

#### Twentieth Century Portraiture

Among the men who led the anti-sentimental revolution were Anselm Feuerbach (1828–80), Charles Piloty (1826–86), whose technique was rendered the more conspicuous by a feeling for colour which his compatriots of the preceding generation had disdained, and Gabriel Max, whose pictures possess a personal handling that removes them somewhat from the school with which nationality associates him. But Adolph Menzel (1815–1905), own brother to the French Meissonier, was the painter of most distinctive force and versatility, who owed least to anyone, who was virtually self taught, and excelled equally in colour and black-and-white.

In modern portraiture, which is the measure of the greatest in figure painting, Francis Lenbach (1836–1904) proved that he could hold his own with the ablest, whether of the 17th or the 19th century. Of the realists, none has a better claim to mention than the greatest painter modern Germany has produced, William Leibl

(1844–1900), whose *joie de peindre* recalls the most zealous of the Dutch artists. Others who may be named are Eduard von Gebhardt (1838–1925), Hans Thoma (1839–1924), Max Liebermann (1847–1936), Fritz von Uhde (1848–1911), Max Klinger (1857–1920), and Stuck (1863–1928).

Before and during the First Great War a strong reaction against Impressionism began to make itself felt. It affected the German masters of this originally French school of art, Lovis Corinth and Max Slevogt themselves, giving more vigour to their already powerful style. It provoked interesting experiments in Cubism, such as Lionel Feininger's mysterious groups of buildings, and an Expressionism in

which Oscar Kokoschka (later in London) and others found their own new ways. Abhorred as Leftists and internationalists by Hitler, they had to make way between 1933 and 1945 for third-rate practitioners.

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## GERMANY FROM 1939

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*This is an account of German events from the civilian angle during the years 1939–57. For German military history during 1939–45 see Europe, Western: Its Liberation; Russo-German Campaigns; Second Great War. See also biographies of Hitler and other Nazi leaders; Adenauer, etc.*

After the defeat of France, Hitler declared in July, 1940, that he could see no reason why the war should continue. German propaganda described this declaration as a "peace offer," and Britain's refusal to accept it was cited for years in Nazi propaganda as proof that the British government was responsible for the continuation of the war.

Listening to foreign broadcasts in Germany was on Sept. 1, 1939, made a crime punishable by penal servitude or, in certain cases, by death. After the first leaflet raid by the R.A.F., it became punishable to touch any leaflet dropped from the air. From time to time during the war the German authorities announced sentences and executions under these decrees. Anti-Bolshevist propaganda was stopped and trade between Germany and the Soviet Union continued smoothly, right up to June 22, 1941, the day of the German attack on Russia.

The persecution of the Jews, pursued relentlessly since 1933, was intensified almost immediately Hitler had entered upon this, "the greatest of all struggles." Mass deportation of German Jews to Poland began in Oct. At the same time, any German who might show sympathy with them was threatened with dire punishment. Before these deportations began Jews had been deprived of all civic rights: they had re-

ceived no clothing coupons, had been allowed to shop only between 4 and 5 p.m., and had not been allowed to use air raid shelters, one of the objects of the Nazis being to give the ordinary German the feeling that there were people much worse off than himself. In the autumn and winter of 1940 the Gestapo started to kill thousands of Germans said to be incurable, mentally defective, or too aged or infirm to be of any use in the war effort. Both Protestant and R.C. churches made useless protests against these so-called "mercy killings."

#### Extermination Camps

The concentration camps of Dachau, Belsen, Buchenwald, and many others were established long before the war. The number of concentration camps, some of them in fact extermination camps, grew until mass murder became an industry carried on by special units of the S.S., officially named Death Head Formations. In one of these death camps at Auschwitz (Oswiecim) about four million people were murdered between 1941 and the end of the war.

R.C. church schools, monasteries, and convents were closed, and measures were taken against other R.C. institutions and practices. Protestant pastors, especially those belonging to the Confessional Church, were arrested in great numbers or sent into the army or into munition factories for com-

pulsory labour. A ban was imposed on the sale of all religious literature, and on the sending of such literature to men in the armed forces. The Nazi determination to stamp out Christian belief and practice weakened later, however, not only because of the growing resistance of the churches. The early onset of an exceptionally hard winter, the miscarriage of Hitler's strategic plans in Russia, involving tremendous casualties and hardships for the German forces engaged, and the intensification of raids by the R.A.F. strained the whole Nazi system, so that the energetic pursuit of the plan to suppress the churches seemed likely to endanger both the unity of the home front and discipline in the army.

#### Hitler as Army Leader

In Dec., 1941, Hitler relieved Field Marshal von Brauchitsch of his post as c.-in-c. and personally assumed the leadership of the army. Under him was Field Marshal Keitel, chief of the high command of the armed forces, and General Halder, chief of the army general staff. In addition there was an operational staff under General Jodl. So confident had Hitler been of a rapid victory over the Red Army that he had neglected to make preparations for a winter campaign. In the middle of the winter, on Dec. 20, Goebbels, minister of propaganda, launched an appeal for warm clothing and blankets as a Christmas present from the German people to the soldiers on the Russian front, where frost-bite had assumed the dimensions of a catastrophe. A few days before, on Dec. 11, Hitler had declared war on the U.S.A.

Enormous losses in men and material in the Russian winter campaign of 1941-42 compelled the Nazi government to intensify the regimentation of the human and material resources of Germany, her satellites, and the occupied countries. New restrictions were imposed upon the manufacture of consumer goods, although even then there was still nothing like the austerity freely accepted in Britain. According to the German ministry of labour, in Jan., 1942, the total German labour force had fallen from 26 million before the war to about 24 million, including over two million foreign workers from Italy and the occupied countries, but not counting 1.6 million prisoners of war who had been put to work. Some of the foreign workers, of

whom just over a million were Poles, had been attracted by bribes and promises of a higher standard of living; but from 1941 onwards the Nazi authorities had to resort increasingly to threats, compulsion, and brute force, and in March, 1942, Sauckel, Gauleiter for Thuringia, was appointed labour controller for the whole Reich. Once an obscure agitator, and one of Hitler's old guard, he had, by a process of expropriation and blackmail, risen to the ownership and control of industrial enterprises employing many thousands of workers. He was equipped with sweeping powers for the mobilisation of German and foreign labour.

All through the war Germany had a system of differential food rationing. Consumers were grouped into the following categories: children, under 3, 3 to 6, 6 to 10 years; juveniles, 10 to 20 years; normal consumers over 20; night workers; heavy workers; very heavy workers. Bread, potatoes, fruit, fish, and vegetables as well as meat, fats, and sugar, were rationed in Germany, but there was a considerable traffic in food between town and country; and German soldiers abroad sent home quantities of food, apart from official requisitions carried out by the German occupation authorities. The first large scale cut in rations, affecting bread, meat, and fat, was made in the spring of 1942, and the dismissal of Walter Darré, prophet of the "blood and soil" theory, from his post of minister of food and agriculture and Reich peasant leader, in May, 1942, was probably connected with this deterioration in the food situation. His place was taken by Backe, his former under-secretary.

#### Himmler Controls all Police

The growing weight of British bombing produced changes in German internal organization. In June, 1942, Himmler (*q.v.*) took over the A.R.P. services and reorganized them under the title of A.R.P. Police. All branches of the German police force had already been integrated with the S.S. through a system of dual membership whereby higher police officers were also high ranking members of the S.S. Inside the S.S., and indeed inside almost every organization and institution in Germany, there operated the special security service, the S.D. The Waffen-S.S., the fully mobilised and heavily armed section of Himmler's S.S. guards, of an

estimated strength of 250,000-300,000, was entirely independent of the army. Its chief task was to fight the guerrillas behind the German front in Russia, and the growing resistance movements in all the occupied countries of Europe. The cruelty and brutality it displayed were calculated not only to intimidate workers in the resistance movements but also to frighten the Germans themselves into even more unconditional obedience. Non-German units were added both to the S.S. and the Waffen-S.S. and sometimes stationed in Germany.

#### Hitler, Supreme Law Lord

In April, 1942, Hitler addressed a special meeting of his Reichstag, and proclaimed himself supreme law lord. He announced that, anticipating the agreement of the Reichstag, he had already "ruthlessly eliminated" a number of people who had not proved equal to the strain of the war on the Russian front. In May, it was announced that 14 Germans had been executed in Mannheim for attempting to undermine the war effort. In Aug., Hitler appointed Dr. Thierack minister of justice and ordered him "to build up a National Socialist administration of justice as I direct," and if necessary "to depart from existing law." Since 1934 Thierack had been president of the so-called peoples' court in Leipzig and had passed sentence of death on thousands in that capacity. In Aug. also Professor Brandt, one of Hitler's personal doctors, was appointed special commissioner for health services, with power to allocate doctors, hospitals, and medical supplies between military and civilian claims; in Oct. Dr. Ley, head of the Nazi labour front, was appointed Reich housing commissioner and equipped with dictatorial powers to solve the growing housing problem caused by R.A.F. attacks. These were only two of a number of special commissioners created during 1942, apparently in the belief that difficulties could be decreed out of existence.

On Jan. 30, 1943, Hitler had been in power for 10 years. For the first time the anniversary was not celebrated. Hitler did not speak because, it was explained, he could not leave the front. Next day the Russians announced the annihilation of the German 6th army at Stalingrad.

On Jan. 28 Sauckel issued a decree requiring all German men between 16 and 65 and all women

between 14 and 45 to register at local labour exchanges for national defence work. Only women with one child below school age or two children below 14 were exempted. The Germans were told that there were more women than men in British war factories; that the Russians were a nation of underfed and badly clothed slaves who were being driven to work and to fight by commissars armed with whips and machine-guns; that Roosevelt was cancelling all democratic liberties; but that in Germany total war was still, for millions, nothing but a slogan. Except for air raids, said an official announcement, people at home had been living, in comparison with the soldiers, as though there were no war at all.

The official admission from Hitler's H.Q. that Stalingrad was lost came on Feb. 3. All places of entertainment were closed for three days as a sign of national mourning, and the Nazi leaders used fear of the fate which Germany would suffer if Bolshevism were to be victorious as a spur to flagging energies. Possible saboteurs and traitors still to be found in Germany were threatened with growing ferocity. The man-power drive was extended to the occupied countries; in France, with the connivance of the Vichy government, French workers were recruited for Germany by mass deportation.

#### Widespread Allied Air Attacks

By the summer of 1943 there was no place in Germany out of reach of Allied air attack, the weight of which sometimes exceeded in a week the bomb load dropped by the Luftwaffe on London during the whole of the years 1940-41. In all the large industrial cities extensive areas were in ruins. Luftwaffe opposition, A.A. batteries, and the A.R.P. services were beginning to wilt. German men, women, and children, terrified and exhausted, streamed from their burning cities into the surrounding countryside. In addition, the authorities ordered large-scale evacuation. German home propaganda simultaneously denounced the "Anglo-American air terror" and reminded the Germans of the spirit shown by the British in 1940.

Himmler, now minister of the interior and "plenipotentiary for the administration of the Reich," announced in Oct. that 104,286 persons had been killed in air raids in 12 German cities during April 1 to Oct. 25, 1943; in Hamburg

alone the death roll was nearly 30,000. According to official German estimates published in Nov., 80 p.c. of the built-up areas of Cologne, Hanover, Cassel, and Mannheim had been destroyed, 70 p.c. of Hamburg, 60 p.c. of Essen, 30 p.c. of Munich. Large parts of Berlin were destroyed in a series of heavy raids during Nov.

#### The July Plot

Throughout the spring of 1944, the German forces were being driven back in Russia, in the Balkans and in Italy. The German power of resistance in the W. had been steadily undermined by an incessant and overwhelming air offensive. In May the Nazi government announced the appointment of political commissars in all units of the German army. On June 6 the Allies landed in N. France. Six weeks later, on July 20, an attempt was made on Hitler's life by high-ranking officers at his headquarters in East Prussia. A number of his staff were killed or injured, but Hitler escaped with minor injuries. The placing of the bomb was part of a plot to overthrow the Nazi regime which had started before the outbreak of war.

When Hitler came to power in 1933 the German generals had hoped to use him and his party as an instrument in their policy of rearmament and military aggrandisement. They turned a blind eye to the origins and criminal nature of the men he appointed as ministers. For a time they were able to keep the army outside the control of the Nazi party. In 1934 they even compelled Hitler to destroy the S.A. (Brown Shirts), a possible counter-organization, in the purge of June 30. During the following years, however, Hitler succeeded in dominating the army, partly by concentrating all other instruments of power in the hands of the Nazi party—the police, the Gestapo, the administrative machine, the direction of public opinion and of economic activity—and partly because his political and military judgements, up to the attack on the Soviet Union, proved to be better than those of the generals. They feared difficulties from the reoccupation of the Rhineland, but there was none. They planned to remove Hitler at the time of the Munich crisis because they expected a war for which they were not fully prepared, but Chamberlain came to Munich and the agreement gave Hitler all he wanted. In 1939 Hitler told them there would not be war on two fronts, and the Western Powers

proved unable to interfere with the campaign in Poland. Hitler changed the military and strategic plans for this campaign, taking more risks than the generals were prepared to accept, and he proved right. His campaigns in Norway, the Netherlands, Belgium, and France were swift and successful beyond anything they had dared to hope. Those generals who were not inspired with uncritical admiration by these successes were removed from their positions, retired, or given a state funeral after they had met with an accident. The majority remembered that they owed their epaulettes to Adolf Hitler. In the Russian campaign the more cautious and conservative of the generals were proved right for the first time. But their previous surrenders to Hitler and their complicity in his preparations for aggression had left them with little power and less resolution. Moreover, at this stage the price of Hitler's overthrow was unconditional surrender to Germany's enemies. So the majority remained loyal to the oath which Hitler had compelled them to take.

#### Failure of the Plot

In describing the plot of July 20, the Nazis spoke of "an insignificant military clique." On the contrary, it was a far-flung conspiracy. Many of the officers involved had held or were still holding high positions in the German army. The man who placed the bomb, Colonel Count von Stauffenberg, was chief of staff, home army, and associated with him were the scions of some of the oldest Junker families. In addition, a considerable number of civilian groups, ranging from Conservatives to Socialists, were in various degrees connected with the plan. This diversity of men, and of motives, was one of the plot's weaknesses. It caused endless delays and prevarications. The plan also required the death of Hitler to create the necessary psychological shock and consequent paralysis of the Nazi forces. But Hitler escaped.

The narrow failure of the attempt to overthrow the Nazi regime, a failure in which Hitler claimed to see once more "a confirmation of the task imposed upon me by divine providence," was followed by ruthless extermination of all those who had taken part in the plot or were merely suspected of having done so. German records of names and places show that more than 4,980 Germans were destroyed in this purge. Hundreds of executions were carried out, and

Hitler had them filmed. Some of the generals involved, like Fromm, c.-in-c. home army, attempted to save themselves by abandoning their fellow conspirators. Some, like Col. Gen. Beck, former chief of the general staff, committed suicide. Hitler's former favourite, Rommel, was ordered to commit suicide. The rest sent messages of loyalty.

Among civilians implicated were Dr. Karl Goerdeler, former burgomaster of Leipzig, Wilhelm Leuschner, a Socialist trade union leader, Ulrich von Hassell, a former German ambassador to Italy, who were captured some weeks later and executed in Sept. A few days after their execution it was announced that Dr. Rudolf Breitscheid, a former leader of the Social Democratic party, Ernst Thaelman, former leader of the German Communist party, and other political prisoners in the Buchenwald concentration camp had been killed during an alleged air raid by Allied forces.

#### Formation of the Volkssturm

Himmler now succeeded Fromm as c.-in-c. of the home army. His rivals in power during this last stage of Hitler's dictatorship were Martin Bormann, head of the party chancellery, and Josef Goebbels, who tirelessly proclaimed to the German people that new secret weapons were about to change the whole aspect of the war, and that the use of the flying bomb had created panic in London and chaos in Britain's air defence. Goering was eclipsed owing to the failure of his Luftwaffe. Yet another "total mobilisation" was ordered by Hitler, and Goebbels was appointed plenipotentiary for this. Hitler's state of health was now so bad that little was seen or heard of him during the next few months.

By the end of Sept., British and American troops were fighting on German soil. Germany's satellites were turning against her one by one. In the middle of Oct. Hitler announced the formation of the *Volkssturm*, a German home guard comprising all able-bodied men from 16 to 60, under the command of Himmler and officered by members of the Nazi party. Boys of 15 were asked to volunteer for the army, those who had reached the age of 16 were called up, still younger boys and girls were compelled to perform auxiliary duties under the direction of the Hitler Youth. In all areas threatened by invasion, men between 16 and 65 and women between 18 and 55 were conscripted for work on fortifications and trenches. All places of enter-

tainment were closed; there was a severe cut in rations, and there was talk of German guerrillas preparing to fight the enemy in any part of Germany which might be conquered.

Rundstedt launched the last German offensive of the war in Dec., 1944, in the Ardennes; but in little more than a month it was beaten, while the Russians had cut off Silesia and East Prussia from the rest of Germany, and hundreds of thousands of German refugees were fleeing in snow and frost before the advancing Red Army.

In April, Himmler, Keitel, and Bormann issued a joint warning to all military and civilian authorities that anybody who surrendered a German town or village would be sentenced to death, and the German radio continued to announce executions carried out under this decree; and advancing British and American troops uncovered the horrors of Belsen and Buchenwald concentration camps.

With Germany virtually split into two by the Allied advance from E. and W., the Soviet armies launching their offensive against Berlin, and German resistance in Italy and the Ruhr collapsing, it was announced that Field Marshal Kesselring would command the Southern Redoubt where the last stand was to be made. But neither the Southern Redoubt nor the underground resistance by the "Werewolf" organization, announced on April 1, was to materialise.

#### The Last Days in Berlin

Hitler refused to leave Berlin, and Goering asked on April 23 that leadership of the Reich should be handed over to him, in accordance with the decree of 1941 which had appointed him Hitler's successor. Hitler thereupon accused Goering of high treason, had him arrested, but spared his life after he had agreed to resign all his offices. On the following day Himmler, without Hitler's knowledge, offered to surrender to the Western Allies only—an offer that was rejected. Hitler married Eva Braun on April 29. Next day both committed suicide and their bodies were burned in the chancellery garden, now encircled by the Russians. Goebbels and his family committed suicide on May 1. On the same day Doenitz, speaking over the Hamburg radio, announced that Hitler had fallen, and that he had taken over the government. Five days later Doenitz dismissed Himmler, Goeb-

bels (of whose death he did not know), Rosenberg, and Thierack.

Meanwhile, German forces in Italy surrendered unconditionally on April 29, in N.W. Germany, the Netherlands, and Denmark on May 4, in Austria on May 6. Only in Czecho-Slovakia were any German troops still fighting. The general unconditional surrender of Germany's armed forces to all the Allies was signed at Reims on May 7, and confirmed in Berlin on the 9th.

#### Nazi Leaders in Eclipse

Himmler committed suicide when arrested by British soldiers a fortnight after the surrender. Goering's arrest was announced on May 10. Doenitz, with all the members of his "government" and of the German high command, was arrested by the Allies on May 23. Many other German political, military, and industrial leaders were arrested during the following month. A number of them, including Goering, Hess, Ribbentrop, Ley, Rosenberg, Streicher, Keitel, Funk, Schacht, Speer, Papen, Fritzsche, Sauckel, and Doenitz, were indicted for crimes against peace, war crimes, and crimes against humanity, and brought before a military tribunal at Nuremberg on Nov. 20. It lasted for ten months, sentence being pronounced on Oct. 1, 1946. Goering, Ribbentrop, Keitel, and nine others were condemned to death; Hess, Doenitz, and five others to terms of imprisonment. Schacht, Papen, and Fritzsche were acquitted. The German population showed relatively little interest in this thorough examination of a tremendous and disastrous epoch of their own history.

Germany, her eastern provinces annexed by Russia and Poland, was divided into four zones of occupation, under the military government respectively of Britain, the United States, the Soviet Union, and France. The Nazi party and its dependent organizations were dissolved and prohibited. In the Potsdam agreement of Aug., 1945, the occupying Powers declared that one of the main purposes of the occupation was to prepare for the reconstruction of German political life on a democratic basis, and for Germany's eventual peaceful co-operation in international life. They succeeded in restoring order from the chaos they found, and by the autumn of 1946 elections had been held for provincial parliaments, while provincial govern-



ments, with limited powers, had been established.

But the four Powers were unable to agree on many of the issues involved, in particular on the re-establishment of German unity, and the amount of reparations and the method of extracting them. Economic conditions, especially the food situation, steadily deteriorated, although Great Britain and the U.S.A., at the expense of their taxpayers, imported supplies into the W. Western Germany had always received a large part of its food supplies from the eastern provinces, but these deliveries stopped with the occupation. Moreover, between 8 and 10 million Germans, expelled from the territories occupied by Poland and from the Sudeten area of Czechoslovakia, had been added to the population of the western part. The low ration scale fixed could not be honoured, partly because food imports (for which no payment was available) fell behind schedule, and partly because German farmers hoarded food instead of surrendering it to the common pool.

Industrial production in the W. fell far below even the level permitted by the Potsdam agreement. The output of Ruhr coal, vital to industrial activity in France as well as Germany, remained low. Industrial production was also hampered by the appalling housing conditions, the aftermath of the fighting and of Allied bombing, by the workers' uncertainty about the future on account of the dismantling of plant for reparations and the destruction of installations as part of the Allied policy of destroying Germany's war potential.

Coordination of W. Germany began with the setting up, 1947, of a bizonal economic council for the U.K. and U.S. zones, extended to include the French zone in 1948. A drastic currency reform, imposed June 21, 1948, had a miraculous effect on the people's confidence in their currency; more than 90 p.c. of the Reichmarks in circulation having been cancelled, and a new *deutsche Mark* having been created, consumer goods reappeared and industrial production rose rapidly—from about 40 p.c. of the 1936 level to 78 p.c. by the end of 1948, and 99 p.c. by mid-1950. The participation of W. Germany in the European recovery programme was a main factor in recovery.

A constitution for a federal republic of Germany was accepted by the three occupying powers, and

the republic was proclaimed in 1949, with its capital at Bonn. After elections held for the *Bundestag* (lower house), a coalition govt. was formed by Konrad Adenauer in Sept. The upper house (*Bundesrat*) comprised representatives of the *Länder* (states) appointed by their govts. Allied military govt. was replaced by a civilian Allied high commission in 1949, and this ended in 1955, when the sovereignty of the federal republic of Germany was recognised. The Western Allies had terminated the state of war with Germany in 1951, Russia did so in 1955; but by the end of 1957 no peace treaty had been made.

From 1950 W. Germany began to take its place as an independent European nation; it was permitted diplomatic relations with foreign countries in 1950; was accepted as a member of the Council of Europe and a German foreign office was re-created, 1951; and in 1952 Germany was a party to the European defence community treaty. A new German army was envisaged, and a form of conscription introduced.

In 1949 minor alterations in the N.W. frontier of W. Germany were brought about by transfers of territory to the Netherlands, Belgium, Luxembourg, and France. The Netherlands received some 30 sq. m. inhabited by about 10,000 Germans; Belgium some 8 sq. m. with 500 Germans (the major Belgian claims having been postponed); Luxembourg a small area of the Saarland (for the post-war history of the rest of Saarland, see Saar Basin); France a small area adjoining Alsace.

In 1955 the U.N. estimated the pop. of the Federal German Republic (W. Germany) as 49,995,700.

**EASTERN GERMANY.** The Russians walked out of the Allied control council in 1948 and thenceforward administered their zone without consultation with their allies, the area gradually assuming the pattern of other Soviet satellite countries. A draft constitution was accepted in May, 1949, by a "people's council," and on Oct. 7 the "German democratic republic" was proclaimed in E. Berlin, with Otto Grotewohl as prime minister, but with chief power in the hands of Walther Ulbricht, secretary-general of the E. German Communist party and vice-premier. In 1950 the E. German govt. signed an agreement with Poland accepting the Oder-Neisse line as the E. German frontier. Because of the unbalanced economy of E. Ger-

many, and of Russian demands for high expenditure or remilitarisation, hardship was widespread and a continuous stream of refugees, numbering at times thousands a day, left E. for W. Germany. See also Air Lift; Berlin.

**Germ Cell.** Unspecialised or generalised cell in a living body destined to give rise to the eggs and sperms from which the next generation will arise by specialisation of parts. All cells of the body possess a full complement of genes (*g.v.*) which in the somatic cells mediate growth and division and specialisation, but in the germ cells mediate an unspecialised metabolism and a particularly modified division called meiosis (*g.v.*).

**Germinal.** Seventh month in the year as rearranged during the French Revolution. It began on March 21 or 22, and the name means the month of buds.

**Germinal Disk.** Small part of the surface of a spherical egg cell where there is little or no yolk. An egg is a single cell, whether the microscopic egg of a mammal or the enormous yolk of an ostrich egg. (The yolk alone is the egg to the biologist.) In egg cells with little yolk, more or less normal metabolism can occur all over; in egg cells with an enormous amount of yolk, metabolism is greatly impeded. In yolkly egg cells there is always a germinal disk, where development begins, fertilisation takes place, demands for food and oxygen are greatest, and the embryo is formed.

**Germiston.** Town of the Transvaal, S. Africa, 9 m. S.E. of Johannesburg. An important gold-mining centre with a large refinery, and an air and rly. junction, it also manufactures chemicals, agricultural implements, hardware, clothing, etc. Pop. (1951) 168,139, of whom 71,572 were white.

**Germ Layers.** In the development of many eggs a hollow sphere is formed, one side of which becomes pushed in. That part of the hollow sphere which remains on the surface is called the ectoderm, or outer skin, that part pushed in is the endoderm, or inner skin. Between these layers grows the mesoderm, or middle skin. There is a high degree of constancy in the fate of these layers from form to form, homologous structures in different forms being made out of the same layer. Collectively these layers are called germ layers.

**Gerona.** Maritime prov. of N.E. Spain, in Catalonia. It slopes from the Pyrenees to the Mediterranean. Area 2,264 sq. m. Traversed by

the Barcelona-Perpignan rly., it is bounded on the N. by France, on the S. and E. by the Mediterranean, and on the W. by Barcelona prov. One of the richest provs. of Spain, it carries on a large trade, and produces minerals, fruit, fish, timber, cork, copper, lead, iron, ochre, and wine. The coastline, called the Costa Brava, is wildly picturesque and the most popular summer resort in Catalonia. It is indented by a large bay, the Gulf of Rosas, to the N. of which is Cape Creus, the most easterly point in Spain. Portbou is the leading port in the prov. Pop. (1950) 327,321.

**Gerona** (anc. Gerunda). City of Spain, capital of the prov. of Gerona. It stands at the confluence of the rivers Ter and Oñar, 52 m. N.E. of Barcelona, on the main rly. from Barcelona to Perpignan. It is connected with its suburb El Mercadel beyond the Oñar by a bridge. Its cathedral, begun early in the 14th century, is a fine specimen of Gothic architecture. Its manufactures include paper and textiles; coal, iron, and lead are mined near by. Pop. (1950) 28,915.

Gerona was a place of some importance during the Punic Wars, and it has had a tempestuous history, having been besieged numerous times. It is principally famous for its heroic defence by a few Spaniards and English volunteers against the French in 1809, the garrison finally capitulating through famine and disease. The city suffered severely from floods in 1762 and in 1829. It is the seat of a bishopric dating from the 3rd century. During the Spanish Civil War, with Republican refugees streaming towards the French frontier, Gerona fell to General Franco's forces on Feb. 4, 1939.

**Gerontius**. General in the service of Constantinus (*q.v.*), the usurping tyrant in Gaul. After Constantinus was defeated in 408, Gerontius rebelled against him, proclaimed Maximus, belonging to the household troops, and possibly his own son, emperor, and, having put Constans, son of Constantinus, to death, set out in pursuit of Constantinus, who had fled to Arles (Arles). Meantime, Honorius had dispatched troops against Constantinus, and, securing his person on the surrender of the town, put him to death. Gerontius fled before Honorius's superior forces, but was seized by his own mutinous troops, who resented his severity. These fired the house in which he took refuge with his wife and one faithful servant, and after

a brave resistance Gerontius slew his wife and servant at their own request, and then stabbed himself.

**Gerontology** (Gr. *geron*, old man; *logos*, a discourse). The scientific study of the problems of old age and of the ageing process. The name is used by some people as a synonym for geriatrics (*q.v.*), but properly has a wider connotation as it is not limited to consideration of the elderly sick. It is of great importance on account of the changing structure of the population in all countries, except the most primitive, whereby the proportion of older people is increasing steadily. There are throughout the world biologists, psychologists, and sociologists concerned with the study of (i) the physiological processes involved in the normal ageing of tissues and the physical factors which influence such processes; (ii) the response of the elderly to stimuli, both physical and mental, to determine their capacity for work and their ability to learn new skills. The practical application of this is seen in, *e.g.*, the establishment of working units for older men, where, under sheltered conditions, they undertake the normal work of the factory, but at a slower tempo and for shorter hours.

**Gerry**, ELBRIDGE (1744-1814). American rebel, business man, and politician. Born at Marblehead, Mass., July 17, 1744, he was educated at Harvard and entered his father's business. As a member of the general court of Massachusetts, he showed marked hostility to British rule. A deputy to the 2nd continental congress, 1776, he signed the Declaration of Independence on Sept. 3; he also signed the articles of confederation 1777. He was a strong supporter of John Adams, and in 1797 was one of a mission of three sent by President Adams to the Directory of France which tried fruitlessly to negotiate a trade treaty. As governor of Mass., 1810-12, he was responsible for a state law rearranging electoral districts which gave rise to the term gerrymander (*v.i.*). He became vice-president in 1813, and died at Washington Nov. 23, 1814.

**Gerrymander**. An American term for a method of arranging the boundaries of an electoral

division so as to give an unfair advantage to a particular party or candidate. The name originated in 1812, when Elbridge Gerry was governor of Massachusetts. The Republican majority in the state legislature divided Essex county in such a way as to ensure success at the next election. Gilbert Stuart, the painter, happened to call at an office where a map, showing the distortion of this district, hung on the wall. He added with a pencil a head, wings, and claws, and remarked "That will do for a salamander." "Better say a gerrymander," commented someone, and the term passed permanently into American politics. A notorious example occurred in 1890, when William McKinley lost his seat in congress because his opponents, having gained control of the Ohio legislature, removed from his constituency the sections containing most of his supporters.

**Gers**. Dept. of S.W. France. Area 2,428 sq. m. Tributaries of the Garonne, the Gers, Baise, Save, Gimone, and others coming down from the Pyrenees are the chief rivers. The Adour also flows through the dept., which is hilly, especially in the S. Wheat, maize, and oats are grown; wine and brandy are made; and horses, cattle, sheep, and poultry are reared. Auch is the capital; other towns are Lectoure, Mirande, Condom, and Eauze. Before the Revolution most of the area was in Gascony. Pop. (1954) 185,111.

**Gershwin**, GEORGE (1898-1937). American composer. Born in Brooklyn, Sept. 26, 1898, of Jewish parentage, he made his name as a composer of dance music for George White's Scandals, 1920-24. His musical comedies, in which the Astaires appeared, included *Lady Be Good*!, 1924; *Stop Flirting*, 1925; *Funny Face*, 1927. In larger compositions he blended a haunting lyrical note with syncopated rhythms, and his *Rhapsody in Blue*, 1923, was long in the orchestral repertory. With a concerto in F, 1925; *An American in Paris*, 1928; *Second Rhapsody*, 1931, Gershwin elaborated this method. His most ambitious work was *Porgy and Bess*, 1935, an opera based on Negro themes, which ran in New York and London. He died at Hollywood, July 11, 1937. A film, *Rhapsody in Blue*, based on his life and music, appeared in 1945.

**Gerson**, JEAN CHARLIER DE (1363-1429). French scholar and divine. He was born in humble



Elbridge Gerry,  
American rebel

circumstances at Gerson, Dec. 14, 1363, and educated at the college of Navarre, Paris. Taking holy



J. C. de Gerson,  
French scholar

orders, he became canon of Notre Dame and chancellor of the university of Paris in 1395. He worked hard to check the careless lives of the clergy, to end the Great

Schism then dividing the papal court, and to amend the too scholastic education of the university. His outspokenness led to his withdrawing to Rattenberg in Tirol in 1418 for a time, during which he wrote his best known work, *On the Consolation of Theology*. Later he retired to a monastery at Lyons, where he died July 12, 1429.

**Gersoppa.** Village and falls of Bombay, India, in the Honavar sub-division of North Kanara district. The great ruins of Nagarbastikere, the capital of the Jain chiefs of Gersoppa (1409-1610), are about 1½ m. E. of the village. According to tradition the capital contained 100,000 houses and 84 temples. The Gersoppa Falls, which are unrivalled in India, lie 18 m. E. of the village, and are on the Sharavati river. At this spot the river has a breadth of about 230 ft., and the water falls over a cliff 830 ft. high in four leaps, called the Horseshoe, Roarer, Rocket, and Dame Blanche.

**Gerstacker, FRIEDRICH** (1816-72). German traveller and writer. Born at Hamburg, Nov. 10, 1816, he went to America, where he travelled extensively afoot during 1837-43. Having told his experiences in a series of diary-letters, he returned to Germany to find himself famous. Thenceforth he devoted himself largely to descriptive books of travel. He went round the world, 1849-52; journeyed in S. America, 1860-61; in Egypt and Abyssinia, 1862; and in N. and Central America and the W. Indies, 1867-68. He also won success with some fiction largely inspired by his travel experiences. He died at Brunswick, May 31, 1872.

**Gerstenhofer Furnace.** Type of roasting furnace first used at Freiberg in Germany, but also extensively employed at Swansea for the roasting of pulverised copper matte. It is a shelf furnace in the form of a square shaft, across which are arranged at equal distances, and one above the other,

a number of horizontal fireclay bars. The ore is introduced at the top and falls from bar to bar, arriving at the bottom to a very large extent desulphurised. See Furnace.

**Gertrude.** Name of two saints of the Latin Church. (1) Gertrude (d. March 17, 659), a daughter of Pepin, the father of Charlemagne, was the first abbess of the convent of S. Gertrude at Nivelles, Belgium. On the high altar of the existing (11th century) edifice is a beautiful 13th century reliquary of S. Gertrude, who is revered as the patron of travellers and pilgrims and as giving protection against rats and mice. Her festival is kept on March 17.

(2) Gertrude, born at Eisleben, Saxony, Jan. 6, 1256, became an abbess. She had many visions and wrote some mystical exercises. She died in 1311, and her festival is kept on Nov. 15.

The name, of Teutonic origin, means spear maiden and is one of a group to which Gerald belongs. It is found in the Nibelungenlied and is a popular feminine Christian name in England.

**Gerund.** In grammar, a noun formed from a verb. In English it is obtained by adding *-ing* to the verb, e.g. walk, *walking*. Like the infinitive, or any other noun, the gerund may be subject or object of a verb: compare "walking is good exercise" with "I enjoy walking." When the gerund is part of a compound noun it is identical in form, though not in meaning, with the participle, a verbal adjective. The different use is seen in *singing* bird (a bird which sings—adjective—participle) and *singing* lesson (a lesson in singing—noun—gerund).

**Gervinus, GEORG GOTTFRIED** (1805-71). German author. Born at Darmstadt, May 20, 1805, and educated at Giessen and Heidelberg, he became a teacher. His *History of German Poetry*, 1853, is a work of great value; the nucleus had appeared between 1835 and 1842 under a different title. In 1837 appeared his *Foundations of History*. He was appointed professor of history and literature at Göttingen, where he was one of the seven professors expelled in 1837 for their protest against the unconstitutional acts of Ernest Augustus. Gervinus was anxious for the unity of Germany, and in this cause he founded in 1847 *Die Deutsche Zeitung*, and in 1848 was a member of the Frankfurt parliament. His other works include *Shakespeare Com-*

mentaries, Eng. trans. 1863. He died March 18, 1871.

**Geshur.** One of the ancient states of Palestine, lying E. of the Jordan. David married a daughter of its king, and it was here that Absalom took refuge.

**Gesner, KONRAD VON** (1516-65). Swiss zoologist. He was born at Zürich, where he passed the whole of his life as a physician, and, latterly, a lecturer in physics. His *Historia Animalium*, 1551-58, established him as the father of modern zoology, but he was known to his contemporaries almost solely as a botanist and naturalist, earning the name of the German Pliny. He also wrote *Bibliotheca Universalis*, an encyclopedia of writers and languages. He died Dec. 13, 1565.

**Gesneriaceae.** Large family of herbs and shrubs. They are chiefly natives of the warmer regions of America. Some of the species, such as *Gloxinia*, have tuberous roots. They have opposite, wrinkled leaves, and showy tubular flowers of scarlet, blue or, sometimes, white.

**Gessner, SALOMON** (1730-88). Swiss poet. He was born in Zürich, April 1, 1730, where he set up as a



Salomon Gessner,  
Swiss poet

bookseller, but soon turned to literature, also painting and engraving landscapes. He won his chief popularity in Germany by his sentimental *Idyllen*, 1756. His *Tod*

*Abels* (Death of Abel), 1758, written in an irregular kind of loose poetry, enjoyed considerable success in Germany, and was translated into six European languages. By 1788 it had passed through 30 English editions, and was praised by Scott and Byron. In 1772 he issued a second series of *Idyllen*, and *Letters on Landscape Painting*. His *Idylls*, with one of the *Letters*, were translated into English, 1798. Died March 2, 1788.

**Gesso** (Ital., plaster). Preparation of plaster used as a ground for painting or laid over another substance for the same purpose. It must be used with care, as it is liable to chip. Gesso duro (hard plaster), specially made of gypsum, has been utilised for sculpture work, generally in low relief. See Painting; Sculpture.

**Gestapo** (Ger. abridgement of *Geheime Staatspolizei*, secret police of the state). Nazi organization.

It was founded immediately after Hitler's advent to power for the specific purpose of preventing opposition to, or criticism of, the government, and for eliminating potential adversaries or politically undesirable elements, whether Germans or citizens of subjugated countries. Members of the Gestapo were recruited from the most rabid Nazi party adherents.

Originally there was a Gestapo in each individual German state; thus the Prussian organization was the instrument of Goering in his capacity of Prussian prime minister. Beginning with that of Bavaria in Nov., 1933, these bodies were amalgamated under Himmler, and soon wielded unlimited power of life and death over all Germans and subject persons. Their ramifications and spies penetrated into every corner of public and private life; searches, arrests, detention in concentration camps, tortures, and murders were uncontrolled, and against the Gestapo there was no appeal. Every member of the organization, which totalled 40,000, most of whom operated in mufti, had authority over all over officials, irrespective of rank, and could draw upon the S.S. and armed forces for assistance.

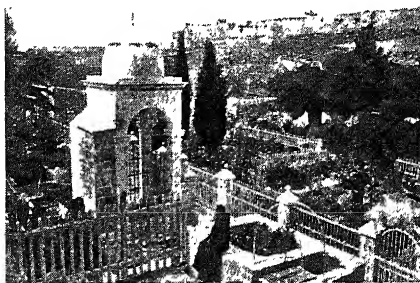
Strict discipline was maintained, and eventually members were themselves spied upon by a super-Gestapo (*Sicherheits Dienst*, security service, numbering 3,000). The virtual head of the Gestapo under Himmler was Heydrich, assassinated at Prague in 1942; he was succeeded by the Austrian Kaltenbrunner. The Gestapo and S.D. were both indicted as criminal organizations at the Nuremberg trials and found guilty on all counts. *Consult* Gestapo, E. Crankshaw, 1956.

**Gesta Romanorum** (Deeds of the Romans). Medieval collection of tales from Roman history and other sources, probably compiled about the close of the 13th century to provide stories to enforce or enliven lessons from the pulpit. The collection was first printed at Utrecht in 1473, the first English edition being issued by Wynkyn de Worde about 1510. There have been many later versions, the fullest being that by C. Swan, 1824, new ed. 1905.

**Gestation** (Lat. *gestatio*). The act of carrying the young in the womb or uterus from conception to birth. In the human species the average duration of gestation is 278 days. No legal limit is laid down in England or Scotland for

divorce proceedings or deciding legitimacy. In 1921 Lord Birkenhead held on medical evidence that 331 days was not impossible. *See* Pregnancy.

**Gesture Language.** Communication of thought by movements of parts of the body other than the organs of speech. Gesture may be (1) explicit, as in pointing or holding up a coin; (2) pantomimic, as in pretending to drink; (3) emotional, as in shrugging the shoulders; (4) conventional, as in raising the hat.



Gethsemane. The garden near Jerusalem which tradition marks as the scene of Christ's betrayal

All these forms denote concrete ideas rather than words. The last three may consist of grimace; the first three are mutually intelligible to persons of every grade of culture when for any reason unable or unwilling to converse by speech. Conventional gesture may be unintelligible without previous explanation. Natural gesture never attained the power to communicate abstract ideas, or to represent the more complex parts of speech. It reached its highest developments in recent centuries among the Indians of the N. American plains and the populace of Naples.

No normally speechless community has ever been recorded. Voluntary vows of silence, such as those taken by some Trappist monks, and the involuntary silence of deaf mutes have led to the invention of conventional systems, more or less elaborate, of manual signs. *See also* Language; Phonetics; *consult* A Psychology of Gesture, C. Wolff, 1945.

**Getae.** Thracian tribe, later called Daci. Their earliest home was on both banks of the Ister (Danube) from its mouth as far as the Tisza (Theiss). Burbista (Boerebista) founded a Dacogetic kingdom about 50 B.C., which after his death fell to pieces. It was revived during the early empire, but the territory was conquered by Trajan (A.D. 106) and

made a Roman province. The Getae were considered noteworthy by the Greeks for their prowess as cavalry, for their belief in the immortality of the soul, and for their worship of Salmoxis, sometimes identified with Sabazius the Thracian Dionysus.

They were in no way akin to the Goths, by whom they were absorbed in the 3rd century.

**Gethsemane.** Isolated spot on the slope of the Mt. of Olives, about  $\frac{1}{2}$  m. from Jerusalem. A garden in Gethsemane was a favourite resort of Christ, and it was there, or near by, that He was betrayed by Judas. A garden, still preserved as the actual one, is considered by modern explorers to be too near the city walls. Excavations were carried out in the garden in 1920, in the course of which remains of a 4th century and a 13th century church were discovered. The subject of the agony in the garden has inspired

painters, e.g. Bellini, Mantegna, to produce masterpieces. *See* Jerusalem.

**Getter.** Device used in high vacuum apparatus to remove the last traces of gas. In the manufacture of thermionic valves for radio, cathode ray tubes, etc., it is essential to attain a high state of vacuum. This is effected by various forms of vacuum pump, and the valve is then sealed with a getter inside, usually in the form of a flat pellet. The getter is then volatilised by electrical heating, usually induction, and by some means, either chemical combination or physico-chemical absorption, it collects such gases as remain and then deposits itself on the inner surface of the glass bulb of the valve. Getters are commonly made of barium, aluminium, magnesium, and their alloys. *See* Thermionic Valve; Vacuum.

**Gettysburg.** Bor. and co. seat of Adams co., Pennsylvania, U.S.A. It is 70 m. N. of Washington and 25 m. S.W. of Harrisburg by rly. It was planned in 1780, named after General James Gettys, made a co. seat in 1800, and a bor. in 1806. Of its two Lutheran institutions, the theological seminary dates from 1826 and Gettysburg College from 1832. The field of the great battle of July 1863, was dedicated in Nov., 1863, as a national cemetery; it contains 3,629 graves and a number of

memorials, including one which, surmounted by a statue of Liberty, has at its foot figures symbolical of War, Peace, History, and Plenty. A peace memorial, with a flame burning from dusk to dawn, was dedicated by President F. D. Roosevelt, July 3, 1938. Pop. (1950) 7,046.

**Gettysburg, BATTLE OF.** One of the decisive conflicts of the American Civil War. It was fought at Gettysburg, Pa., July 1-3, 1863. The Federal army of the Potomac, 82,000 men, under General Meade, defeated the Confederate army of North Virginia, 73,000 men, under General Lee, but the Confederate leader escaped by a masterly retreat across the Potomac, withdrawing his broken army into Virginia. The losses were estimated as follows: Federals, 3,072 killed; 14,497 wounded; 5,434 prisoners and missing; Confederates, 2,592 killed; 12,709 wounded; 5,150 prisoners and missing. See American Civil War.

**Gettysburg Address.** Delivered by President Lincoln when, on Nov. 19, 1863, a national cemetery was dedicated at Gettysburg, Pa., where the previous July, Meade had defeated Lee in a battle which proved the turning-point in the American Civil War. The chosen speaker was Edward Everett, regarded as the most eloquent American of his time; not a sentence of his two-hours' oration is remembered today. Towards the close of the ceremony, 266 words were added by Lincoln. They appeared to arouse little enthusiasm at the time when they were spoken; but they came later to be recognized as a treasure of American oratory and English prose. They are carved on the Lincoln memorial in Washington.

"Fourscore and seven years ago," Lincoln said, "our fathers brought forth on this continent a new nation, conceived in liberty and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation or any nation so conceived and so dedicated can long endure. We are met on a great battlefield of that war. We have come to dedicate a portion of that field, as a final resting-place of those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this. But, in a larger sense, we cannot dedicate—we cannot consecrate—we cannot hallow—this ground. The brave men, living and dead, who struggled here, have

consecrated it, far above our poor power to add or detract. The world will little note, nor long remember, what we say here, but it can never forget what they did here. It is for us the living, rather to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us—that from these honoured dead we take increased devotion to that cause for which they gave the last full measure of devotion—that we here highly resolve that these dead shall not have died in vain—that this nation, under God, shall have a new birth of freedom—and that government of the people, by the people, for the people shall not perish from the earth."

**Geulincx, ARNOLD** (1624-69). A Belgian philosopher. Born at Antwerp, Jan. 31, 1624, he became professor of philosophy in the universities of Louvain, 1646-58, and Leyden, 1665-69. He founded the system of philosophy known as Occasionalism (*q.v.*).

**Geum.** A handsome, hardy, dwarf perennial herb of the family Rosaceae. Natives of Great Britain, India, and N. America, the height of geums varies from one to two ft. The flowers are red, white, and yellow, and they are propagated by seed in spring, and by division of the roots in autumn. For rock gardens *G. montanum*, which has rich yellow flowers in abundance in early spring, is the most attractive. Herb Bennet and Water Avenas are two wild British geums.

**Gevaert, FRANÇOIS AUGUSTE** (1828-1908). A Belgian composer. Born at Huyse, in E. Flanders, July 31, 1828, the son of a baker, he studied at the conservatoire at Ghent. He became organist of the Jesuit church there. During 1867-70 he had a post at the Paris academy of music, and in 1871 was made director of the Brussels conservatoire. His compositions include many operas; he wrote on the history and theory of music in ancient times, and a standard *Traité d'Instrumentation*, 1885. He died in Brussels, Dec. 24, 1908.

**Gevelsberg.** Town of Germany, in Westphalia. It lies 6 m. W.S.W.

of Hagen, on the Westphalian coal-field, and is a modern industrial town, known for its manufactures of cutlery, stoves, and iron and steel products. Pop. 23,150.

**Geyser** (Icelandic *geysir*). Hot spring from which water is intermittently forced into the air like a fountain. Geysers are characteristic of regions of recent volcanic activity, whence they derive their heat. They are almost confined to three areas: Iceland, New Zealand, and Yellowstone Park, Wyoming, U.S.A. The height to which the water is ejected sometimes exceeds 200 ft. "Old Faithful" in Yellowstone Park, so called because of its regular eruption at approximately hourly intervals, discharges over 10,000 galls. to a height of about 150 ft.

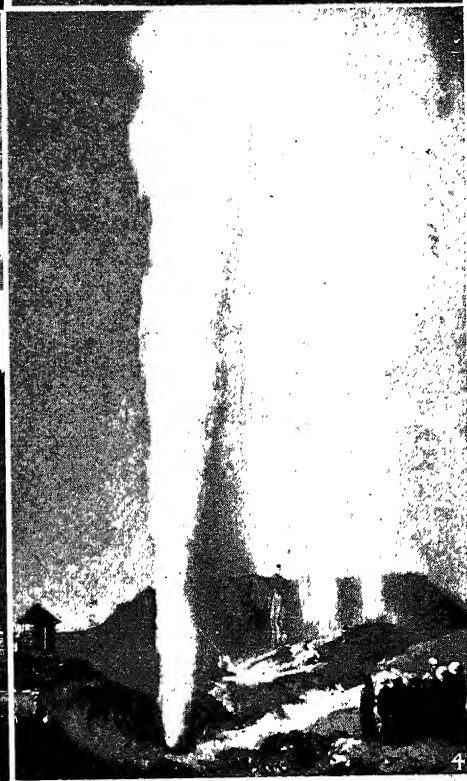
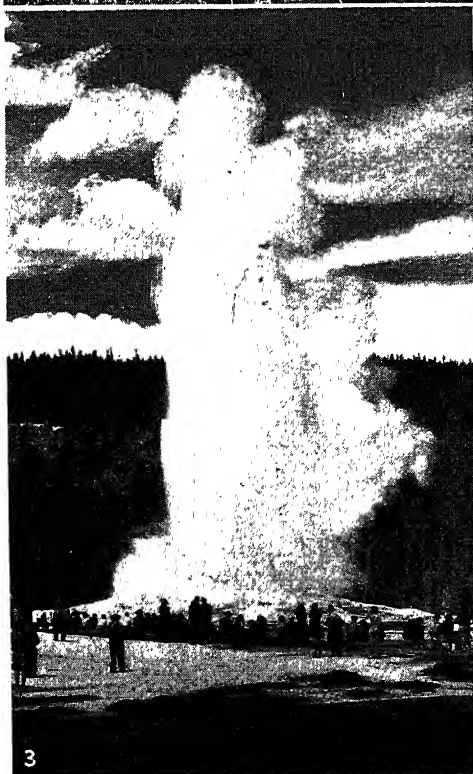
Geyser vents are usually pools surrounded by a mound of geyserite or sinter, material deposited from the hot water as it cools and evaporates. From the centre of the pool a pipe descends into the earth. Measurements show that the temperature of the water in this pipe increases downwards until it is well above the normal boiling point of water. It is prevented from turning into steam by the pressure due to the weight of the column of water in the pipe. Because more water is discharged from some geysers in eruption than could be contained in the pipe itself, it is suggested that the latter is connected with subterranean reservoirs. These must also be filled with superheated water and probably some steam.

With continued heating, the water in the bottom of the pipe begins to boil, and the rising steam causes some water at the top and in the pool to flow out. This preliminary discharge lowers the pressure at depth and the equilibrium of the whole system is disturbed. Immediately this occurs the water in the system is converted into superheated steam which discharges up the pipe, and eruption ensues. After the discharge the pipe and reservoirs gradually fill up again, mainly with water occupying cracks in the rock. Once the system is refilled the cycle starts afresh.

**Geyser.** Name given to a domestic appliance for the rapid supply of hot water at a single point, e.g. to a bath or wash-basin. It consists essentially of a long coil or spiral of tubing through which water continually flows from the source of supply to the outlet. The tube is exposed to a gas or other flame, a large surface of



**Geum.** The variety *Lady Stratheden*. Courtesy of Carters



1. Crow's Nest Geyser, New Zealand. When in eruption it invariably gives two jets at an interval of 90 seconds.
2. Waikite Geyser, one of the largest in North Island, New Zealand.
3. Geyser in Yellowstone Park, Wyoming.
4. Wairoa Geyser, New Zealand, near the scene of the eruption of 1881

**GEYSER: EXAMPLES OF NATURE'S WONDERFUL BOILING FOUNTAINS**



water (but a comparatively small volume) thereby being heated at one time. All such appliances should be properly vented to the open air, to allow the products of combustion to escape; and they should be fitted with a baffle to prevent a down draught, which might extinguish the flame and so cause unconsumed gas to enter the apartment.

**Geyserite.** Variety of opaline silica found in deposits round the geysers of Iceland, New Zealand, etc. Found in masses of pearly lustre sometimes of great beauty, it consists chiefly of silica with 10 to 12 p.c. of water.

**Gezer.** Canaanite city in the coastal plain of ancient Palestine; on its site is Tell Jezar, Israel, 8 m. S. of Lod (Lydda). Strategically important, Gezer was captured by Thothmes III and held by the Egyptians; it is mentioned in the Tell el-Amarna letters. It was ceded to Solomon as dowry for his Egyptian bride (1 Kings 9, v. 16). Macalister's excavations here in 1902-05 and 1907-09 marked a great advance in Palestinian archaeology, producing the first chronological scheme relating successive stages in the fortification of a great city-mound. Neolithic troglodytes living on the site before 3000 B.C., with their primitive high-place and bone implements, were succeeded by Bronze Age city-dwellers; their fortifications with triple gateway enclosed a large area, and a rock-bored water-tunnel ensured water in time of siege. Egyptian influence appears in the late Bronze Age city. Among remains of the time after Solomon were found a stone slab inscribed as an agricultural calendar, and Assyrian and Babylonian contract tablets. The city suffered decline after the exile, but revived in Hellenistic times. *Consult* The Excavation of Gezer, R. A. S. Macalister, 3 vols., 1912.

**Gezira.** Region of the Republic of Sudan. Also called the Blue Nile province, it is situated between the Blue and White Nile. Exceedingly fertile, it produces maize and cotton. The irrigation system of Gezira plain is based on the Sennar dam on the Blue Nile, 160 m. S.E. of Khartum. The scheme, put into operation in 1925, made possible cultivation of approximately 850,000 acres of hitherto waste land, about a quarter of which is devoted to growing cotton. Area 54,880 sq. m. Pop. (est. 1954) 1,840,600.

**Ghadames, GADAMES, OR RHADAMES.** Oasis and town in

the extreme W. of Libya, N. Africa. It is 300 m. S.W. of Tripoli, and is an important centre for the caravan trade of the interior. The Latin form of its name was Cydamus. Pop. (est.) 7,000.

**Ghana.** Independent country of the British Commonwealth, in West Africa. It consists of the former Gold Coast colony and the part of Togoland that was under British administration, and it achieved independence on March 6, 1957, when the duchess of Kent, representing Queen Elizabeth II, opened the first session of the Ghana parliament (formerly the Gold Coast legislative assembly). Accra is the capital. Most of the inhabitants are fetishists, but some 860,000 are Christians, and there are a few Muslims in the north. Ghana was accepted as a member of the United Nations the day after it achieved independence. Area 92,000 sq. m. Pop. (est.) 5,000,000, all Africans except some 13,000. *See* Gold Coast; Togoland.

**Gharbiyeh** OR **Gharbieh.** Maritime prov. of Lower Egypt. It contains the districts of Borollos, Desuq, Fua, Kafr-el-Sheikh, Karf-el-Zayat, Mehalla-el-Kubra, Santa, Sherbin Talkha, Tanta, and Zifta. Area 2,818 sq. m. Pop. (est.) 2,327,000.

**Ghardaia.** Town and oasis of Algeria, in the Sahara. It is about 310 m. S. of Algiers, is walled, and is surrounded by fruit plantations. On one of the principal caravan routes across the Sahara, it gives its name to a territory of S. Algeria. Pop. (est. 1954) 214,500. *See* illus. in p. 275.

**Ghat** (Hindu, path of descent). Flight of steps upon a river bank in India. Designed primarily to facilitate bathing, drinking, and other ritual acts, ghats serve also as landing-places. They are found along the Ganges at every city from Calcutta to Hardwar. Of the 47 ghats at Benares—surmounted by temples, rest-houses, images, and holy wells—five are visited by all pilgrims. Manikarnika, the most sacred, and Smashan—the burning ghats—have cremation grounds. Munshi is the most picturesque, Ghosla the most massive,

Sivala the handsomest, although rivalled by one at Maheswar on the Nerbada. *See also* Ghats.

**Ghats, EASTERN AND WESTERN.** Two great mt. ranges of India. Between them lies the triangular tableland of the Deccan. The Eastern Ghats, a line of small ranges, begin in Orissa, and continue through Andhra and Madras to the Nilgiri plateau, where they join with the Western Ghats. They approach the Bay of Bengal in Ganjam and Vizagapatam dists., but farther south lie inland, leaving between them and the sea a long stretch of low country with a maximum width of 150 m. The Western Ghats, 1,000 m. long, form a sea-wall for the W. side of the peninsula, the Palghat Gap being the main route through this barrier. To the N., near Bombay, two rlys. scale the precipitous face, that climbing the Bhor Ghat being a marvel of engineering.

The two ranges have determined political developments on the coasts of S. India. To the E. the wide lowlands facilitated the spread of civilization, and it was there that the capitals of the great kingdoms of S. India were established; but on the W. side the inhabitants of the narrow coast land, being virtually cut off from the interior by the Western Ghats, were left to develop their own civilization.

**Ghazali, ABU HAMID MOHAMMED EL** (1058-1111). An Arabian philosopher and theologian, called the proof of Islam. He was born and died near Tus, in Khorasan, where he founded a Sufi monastery. Ghazali combines a firm adherence to orthodox Islam with neo-Platonism, and a generally sceptical attitude towards all philosophy. In his writings he sought to free Islam from a dead and uninspiring formalism.



**Ghat.** Hindus laying a pyre at a burning ghat. Benares, where bodies are cremated

**Ghazi** (1912-39). King of Iraq. Educated at Harrow, he succeeded his father, Feisal I, as second king on Sept. 8, 1933. The next Jan. he married Princess Aliyah, daughter of ex-King Ali of the Hejaz; a son Feisal was born May 2, 1935. Ghazi was an enthusiast for modernising his country and a keen sportsman. He died April 4, 1939, from injuries received in a motor accident, and was succeeded by his son Feisal (b. 1935).

**Ghaziabad.** Sub-division of the Uttar Union, India, in the Meerut district. Area, 493 sq. m., about three-quarters of which is under cultivation. Ghaziabad town is on the trunk road from Calcutta to Peshawar, and is a rly. junction. Pop. 25,000.

**Ghazipur.** Dist. of the Uttar Union, India, in the Benares div. Its area is 1,306 sq. m., of which three-quarters is under cultivation. Rice, barley, peas, pulses, and sugar-cane are the chief crops. Ghazipur town contains the tomb of Lord Cornwallis, who died there in 1805. Pop. (1951) 1,141,278.

**Ghazni, GHIZNI, OR GHUZNEE.** Town of Afghanistan. It is about 80 m. S.W. of Kabul, and a place of some commercial importance. Though it stands over 7,700 ft. above sea level, wheat and barley are grown in the neighbourhood. In the 10th and 11th centuries it was the great and flourishing capital of the Ghaznevids, a line of princes founded by the conqueror Mahmud (reigned 998-1030), who ruled over an empire that included most of Afghanistan and Persia, as well as a large part of India. Mahmud's palace at Lashkari Bazar was explored and described in 1949.

They gave place to the princes of Ghur, one of whose sovereigns burned Ghazni, and established himself as head of an empire even larger than that of the Ghaznevids. The ruins of the old town, which are extensive, lie about 3 m. N.E. of the present town, which is on the caravan route from Persia to India, by the Gomal Pass. An old castle dominates the town. In the Afghan Wars Ghazni was captured by Lord Keane in 1839, but the Afghans retook it in 1842, losing

it again same year to the British under Gen. Nott. Pop. 14,000.

**Gheel** OR GEEL. Town of Belgium, in the prov. of Antwerp, about 28 m. E. of Antwerp, near the Albert Canal. It is noted for its insane colony, in which some 3,000 mentally afflicted persons are boarded out with the town-folk for family treatment under official supervision. The colony dates from the 6th century, when according to legend S. Dymphna was murdered at Gheel by her father, and miraculous cures were effected among pilgrims to her tomb, especially in cases of mental trouble. Thus the town-folk have long been accustomed to the presence of the insane in their midst and made a practice of receiving them into their homes.

The patients are divided into two classes: private paying patients living in the charge of persons known as *hôtels*, and poor people in the care of *nourriciers*. The system aims at providing a life near to that which the patient might have enjoyed had he not become insane, and at restoring mental sufferers to a useful place in the community. The colony became a state institution in 1852.

Fifteen days of fighting at Gheel in Sept., 1944, caused widespread damage, including the burning of the fine Gothic church of S. Dymphna, and its annexe, the ancient *chambre des malades*. Pop. (est. 1954) 24,000.

**Ghent** (Fr. *Gand*). Third city of Belgium, capital of the prov. of E. Flanders. It lies 31 m. N.W. of Brussels, at the meeting of the

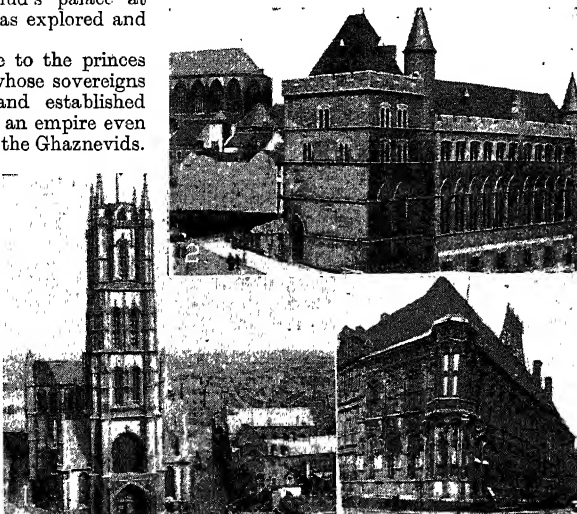
rivers Lys and Scheldt, the arms of which intersect the city in all directions. An important rly. centre, with two large stations, it is situated in the midst of flat, well-cultivated country. Ghent is connected with the S. shore of the estuary of the Scheldt at Terneuzen, about 21 m. N.N.E., by a ship canal, built 1826-27, and deepened 1895-96, and has such good inland waterway communications that it is Belgium's second port. Apart from its administrative importance and its university (founded 1816, Flemish from 1930), Ghent has cotton and linen factories, tanneries, breweries, engineering works, and sugar refineries; a busy trade in timber, phosphates, flax, cement, ores, coal, etc.; and many nurseries and bot-houses. Ledeborg, Mont-St. Amand, and Gentbrugge are populous suburbs. Pop. (est. 1954) 163,600.

Its many old buildings in the Flemish style, the narrow, curving lanes, and the countless bridges and waterways make Ghent one of the most picturesque of Belgian cities. Foremost among the historic buildings is the cathedral of S. Bavon, the city's patron saint, founded about 940, which became a cathedral in 1559. The exterior is plain, but the interior is full of beauty. The choir dates from the 13th century, the nave and transepts from the 16th, and in the cathedral is the famous altar-piece of The Adoration of the Lamb, painted 1420-32 by the van Eycks; some panels of the complete work were sold in 1816, but were returned to Ghent from Berlin by the treaty of Versailles.

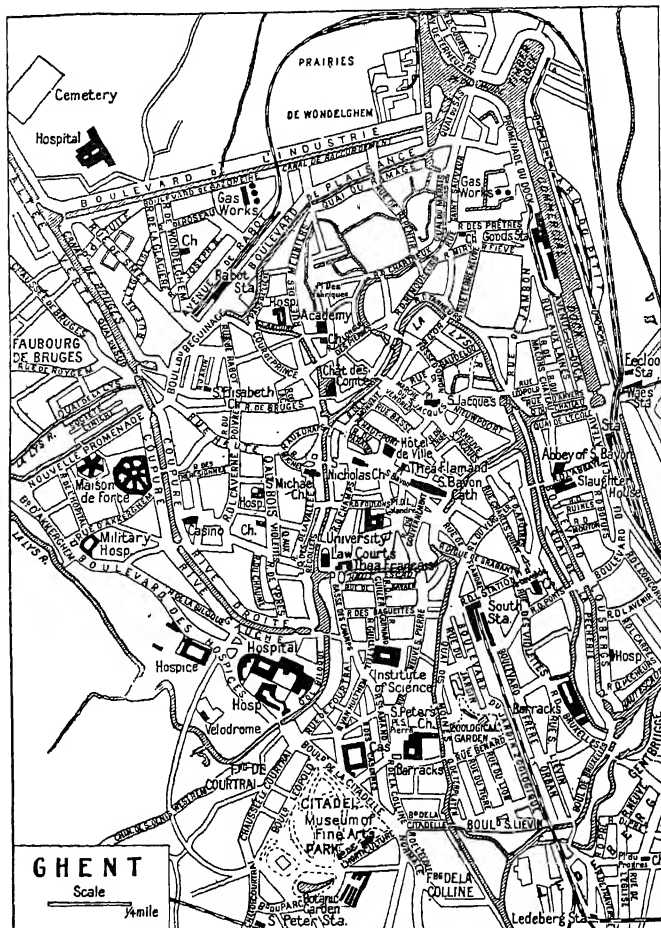
The hôtel de ville is a large block dating in part from the close of the 15th cent., with fine façades of 16th cent. Gothic and early 17th cent. Renaissance styles. A lofty belfry (390 ft.), built mainly in the 14th century, stands in the centre of the town, and not far off is the castle of the counts of Flanders, a typical medieval stronghold founded in the 9th and rebuilt in the 12th cent., the seat of the council of Flanders from 1407 to 1778.



Ghent arms



Ghent. 1. Cathedral of S. Bavon. 2. Château du Diable, 13th century. 3. North façade of the Hôtel de Ville, dating from the 15th century



**Ghika**, ION (1817-97). Rumanian diplomatist. Grandson of Scarlet Ghika, prince of Wallachia, he early developed strong revolutionary principles which necessitated his living in obscurity. He became professor of mathematics at Jassy university, and from 1853 to 1859 he was bey of Samos. He had long been agitating for the union of Moldavia and Wallachia, and when this took place in 1859

Ghika returned to Bukarest and became the first prime minister. He was Rumanian ambassador in London, 1881-89. Died May 7, 1897.

**Ghilan** OR **GHILAN**. Province of Persia. Lying between the Elburz Mts. and the Caspian, it has an area of 4,673 sq. m. It is bounded W. by Azerbaijan, S. by Khamseh and Kazvin, and E. by Manzan-deran. Though suffering from inundations, its soil is fertile, producing wheat, barley, and fruit, and it has a trade in silks. Its chief town is Resht.

**Ghilzai**. Afghan tribe between Kandahar and Kabul. They are Pushtu-speaking Muslims, claiming Turkish descent, and they rank in military prowess with the dominant Durani, but are distinguished by their commercial enterprise. They provide the *povindah* merchants whose camel caravans have for centuries traded between India and Turkistan.

**Ghirlandaio, DOMENICO** (1449-94). Italian painter. Born at Florence, his name was Domenico Tommaso Corrado Bigordi, the adopted sobriquet indicating that he was a maker of garlands. Apprenticed to a goldsmith, he also studied painting under Alessio Baldovinetti (*q.v.*). Between 1480 and his death, Jan. 11, 1494, he produced many important works in tempera and fresco, and in mosaic. Among his most notable paintings are S. Jerome and The Last Supper, 1480, in Florence; the fresco of S. Peter and S. Andrew in the Sistine Chapel, 1483, Rome; Adoration of the Magi, 1488, Florence; the Tornabuoni frescoes, 1490, in S. Maria Novella, Florence; The Visitation, 1491, in the Louvre; and the moving por-

trait of an Old Man and his Grandson, sometimes called The Bottle Nose, also in the Louvre.

His mosaic of the Annunciata, in Florence cathedral, is justly celebrated. In spite of a hardness in his colour effects, Ghirlandaio must be placed among the greatest painters of his century. For a short time Michelangelo was one of his pupils. A son, Ridolfo (1483-1560), was also a painter of ability. *Pron.* Gear-lan-di-yo (hard g).

**Ghost**. Spirit of a dead person manifesting itself in some form perceptible to the senses of the living. Some measure of belief in such posthumous manifestations has been held in all times and by all peoples. The ghost is frequently associated with some crime in which the person has been concerned either as perpetrator or as victim, and is generally said to appear about the hour of midnight and to disappear at cockcrow.

Sometimes these apparitions are described as sheeted ghosts, implying an appearance in their shrouds, and sometimes as appearing in the habit in which they lived, implying spiritual replicas of material things, as in Hamlet. Ghost is also a familiar term for one who furnishes material to or actually writes in the name of an author better known. *See* Psychological Research; Survival.

**Ghost Moth** (*Hepialus humuli*). Common British moth. The male has shining white wings with red-



Ghost Moth. Female, left, and male, right

dish fringes, the female yellowish wings with brown spots and streaks. The under surface of the wings in both sexes is brown. This moth is often seen at dusk, when its peculiar flight causes the white upper side of the wings to appear and disappear, whence its name.

**Ghosts**. Drama in three acts by Ibsen. In this, the psychological study of a mother (Mrs. Alving) and son (Oswald), Ibsen dealt with the evils of hereditary syphilis—a subject which started a battle of the critics throughout Europe. His conclusion would appear to be that a crime against society is more serious than a crime against love. Written in 1881, Ghosts was translated by William Archer, and first performed in England by the Independent Theatre at the Royalty Theatre, London, March 13, 1891. Long banned, it received a first

licensed performance at the Haymarket Theatre, 1914. Notable revivals included those at the Everyman, 1925; Wyndham's, 1928; Arts, 1935; Vaudeville, 1937; Duke of York's, 1943.

**Ghost Train**. Name given to an engineers' maintenance train operating on busy rly. lines at night, particularly on the London Underground. Empty trains run over electrified lines at night in frosty weather, to prevent ice accumulating on the "live" rail, are also referred to as ghost trains.

**Ghost Train, THE**. Comedy "thriller" by Arnold Ridley. Produced at the St. Martin's Theatre, Nov. 25, 1925, this play, the scene of which is laid in the waiting-room of a country station, ran for 655 performances, being chiefly notable for its climax in which the noise of a passing train was reproduced by orchestral effects. It was revived in 1929 and 1934. Various film versions were produced, one featuring Jack Hulbert in 1931, one with Arthur Askey in 1941.

**Ghoul** (Arab. *ghul*). Monster of Oriental legend supposed to haunt burial places and devour the corpses of the dead. Hence the word is figuratively used of anyone who revels in gruesome matters. *Pron.* Gool.

**Ghur**. Town of Afghanistan, 120 m. S.E. of Herat. It was in the 12th century the capital of a powerful empire. *See* Ghazni.

**Ghurian**. Town of Afghanistan, 40 m. W. of Herat and about the same distance from the Persian frontier. A few miles S. of the Hari Rud, it has fortifications.

GHURIAN is an alternative spelling of Garian (*q.v.*), Libya.

**Giacomelli, HECTOR** (1820-1904). French painter. Born in Paris, he early showed talent in draughtsmanship, and studied especially the drawing of birds, flowers, and insects, for the dainty pictures by which he became famous. His illustrations to Michel's *L'Oiseau*, 1867, and *L'Insecte*, 1876, were justly popular.

**Giacosa, GIUSEPPE** (1847-1906). Italian novelist and dramatist. He was born at Collettero-Parella, in Piedmont. Classed among the romantic realists of the period, he wrote all forms of drama, in both prose and verse, the best known of his works being *Tristi Amori*, 1888; *Diritti dell'anima*, a comedy, 1894; *La Signora di Challant*; and *Il più Forte*, 1904. He was editor of the monthly *Lettura*.

**Giannini, GUGLIELMO**. Italian politician. In 1944 he founded in Milan the political satirical weekly



Ghirlandaio. This Italian painter's Portrait of an Old Man and his Grandson, now in the Louvre, Paris

L'Uomo Qualunque, The Common Man, from which sprang the Uomo Qualunque movement. Of fascist tendency, the party won 30 seats in the general election of 1946, but had disappeared as an entity by 1948, when Giannini himself failed to secure election.

**Giant.** Abnormally tall human being. The Greek word *gigas* denoted primarily manlike beings of monstrous size, either wholly mythical, such as Briareus, or reminiscent of traditional oversized races, such as Polyphemus. Similar O.T. traditions attach to the Anakim and Rephaim, tall non-Semitic peoples who occupied Palestine before the Israelite immigration. Og, king of Bashan, and Goliath of Gath, who according to Josephus was 8 ft. 9 ins. high, were of Rephaite blood.

European folklore is much concerned with stories of giants such as Blunderbore and Grim. It attributed to their activities such natural formations as the Giant's Causeway and the Giant's Kettle, with megalithic structures such as Dutch Hunnel-bedden.

Classical and medieval tradition have been brought to the touchstone of fact by measured records of giants in modern times. The tallest races, pre-eminently the Patagonians and the Galloway Scots, who are normally 5 ft. 10 ins., seldom reach 6 ft. 4 ins. The conventional limit of spectacular giantism is 7 ft. The Royal College of Surgeons in London possesses the skeleton, 7 ft. 9 ins. long, of O'Brien Charles Byrne, the 18th century Irish giant. His contemporary Patrick Cottar, whose skeleton was exhumed at Bristol in 1909, was shown to have been 7 ft. 10 ins.; the skeleton of Cornelius MacGrath, now in Dublin, is 7 ft. 9 ins. long. The tallest authentic measurement was the 9 ft. 3 ins. of the Russian Machnov; the same height was attributed to John Middleton, of Hale, Lancs, introduced to James I in 1620. See Dwarf; consult also Giants and Dwarfs, E. J. Wood, 1868.

**Giant Panda.** Animal discovered by Père David of the Lazarist Missionary Society in the bamboo jungles of W. China in the winter of 1868-69. The London Zoo's first specimen (a female named Ming) arrived in the 1930s and died 1944. Another, called Lien Ho (Unity), was exhibited from 1946 till its death in 1950 when it was found to be a male. Their appearance and behaviour took the public fancy, and models and pictures were made. The giant



Giant Panda. Specimen of this animal captured in Tibet and sent to an American zoo

panda is white, with black paws, a black saddle, black ears, and a black patch round each eye.

The use of the name panda for the animal is most questionable. There is a well-known genus, *Ailuropus*, containing the species *A. fulgens*, which is reddish in colour, a little like a fox with a very bushy tail and special paws. It lives in the Himalayas and has long been known as a panda. This animal has woolly soles to its paws and its five digits are rather forward so that none is at all opposable. As the new discovery was similar in some details, the name panda was used with the prefix Giant. The generic name *Ailuropoda* was coined for it, with the specific name *melanoleuca*, black-and-white.

Though the bearlike appearance of the giant panda is at once obvious, zoologists now agree that it is not a bear, and the peculiarity of its paws is taken by many to place it not far from the true panda. The giant panda has developed a most odd modification of the

palm of its forepaw. There is a pad of flesh on to which all the digits are folded back when its food, the bamboo cane, is grasped. This enables the creature to hold the cane so as to give an impression that it is using a thumb, while the thumb is actually lying with the fingers round the cane. A scent pad, protected by the tail and probably of sexual significance, is found in the giant panda as in the true panda; it is not found in the bears. The giant panda is a vegetarian, can climb, sleeps in trees as well as in caves, is about half the size of a grizzly bear, is very hardy, and lives above the winter snow line in the Himalayas, Upper Burma, and the Chinese provinces of Yunnan and Szechwan.

Paul G. 'Espinasse

**Giant's Causeway.** Promontory of columnar basalt lava of the Tertiary age on the N. coast of co. Antrim, N. Ireland. It consists of some 40,000 closely packed polygonal pillars, the pentagonal and hexagonal formations largely predominating. The causeway is 2½ m. N. of Bushmills and is divided by "whin dykes" into three natural platforms known as the Little Causeway, the Middle or Honeycomb Causeway, and the Grand Causeway. The pillars, 15 to 20 ins. diam., each consist of several joints, concave and convex at the extremities, which fit perfectly into one another. The peculiar formation of the columns is ascribed to the cooling and cracking of the lava. It is seen similarly at Fingal's Cave, Hebrides.

The neighbouring cliffs exhibit several remarkable features, such as the Wishing Chair, Lady's Fan, Giant's Loom, and Giant's Organ, with pillars like organ pipes.



Giant's Causeway. Remarkable formation of basalt rock columns on the north coast of co. Antrim. Northern Ireland



**Giant's Kettle.** Large pothole found in the rock beds of former glaciers. A stream on the surface of the glacier descends a crevasse, wearing out a cavity or shaft, at the base of which the Giant's Kettle is formed by the gyration of stones brought by the stream. These holes are often very deep.

**Giant's Ring.** Name applied to a prehistoric monument in N. Ireland, 5 m. S.W. of Belfast, on the co. Down side of the river Lagan. It consists of a circular vallum of 250 yards in diameter, and averaging 15 ft. in height. Almost in the centre of the flat enclosure is a so-called Druids' altar, under which a late Stone Age burial was found.

**Giant Star.** Star of great intrinsic brightness. Luminosity and mass of such stars are about the same, whether they are blue stars such as Spica at a temperature of 40,000° F. or red stars such as Betelgeux at only 5,000° F.; but the red giants make up for their low temperature by their enormous radiating surface.

**Giao-Chi.** Ancient people of Tibeto-Chinese stock in Indo-China. The name in Chinese means forked toes. This physical character, recorded in early Chinese annals, may have resulted from the riding stirrup's being grasped between the first and second toes. When they migrated southward across Tongking their ethnic fusion with Chams and others produced the Annamese type and culture, a mixture of Mongoloid and Indonesian elements.

**Giaour.** Term applied by the Turks to all non-Mahomedans, especially Christians and particularly to Indian-born Portuguese. It does not necessarily imply contempt. The word, the English form of which is adapted from Italian *giurro*, is said to be a corruption of Arabic *Kyafir*, unbeliever. Byron's poem *The Giaour* appeared in 1813. *Pron.* jowr.

**Giarre.** Town of Sicily, in the prov. of Catania. It stands on the E. slope of Mt. Etna, 8 m. N. of Acireale and 40 m. by rly. S.W. of Messina, a junction for the rly. running W. One mile E. of the town is Riposto, its port, whence it exports its celebrated wine.

**Giaque, WILLIAM FRANCIS** (b. 1895). American chemist. Born at Niagara Falls, Ont., Canada, May 12, 1895, and educated at California university, he was appointed instructor in chemistry there, 1927, professor 1934. Awarded the Chandler medal of Columbia university, 1936, for the

invention and first application of the adiabatic damagnetization method of producing temperatures below 1° absolute, he was awarded the Elliott Cresson medal of the Franklin institute the following year. With H. L. Johnson, he discovered oxygen isotopes 17 and 18 by means of the absorption of sunlight in the earth's atmosphere. He was awarded the Nobel prize for chemistry, 1949, for studies in the behaviour of matter in temperatures close to absolute zero.

**Giaveno.** Town of Italy, in the prov. of Turin. It stands on the river Sangone, at an alt. of 1,660 ft., 17 m. by rly. W.S.W. of Turin, with which it is also connected by tramway. It has cotton and jute spinning mills and paper factories.

**Gibara or JIBARA.** Seaport of Cuba. On the N. coast, it is 80 m. N. of Santiago de Cuba, with which it has rly. connexion. It has a sheltered harbour and is the port for a large district producing maize, sugar, bananas, coconuts, tobacco, coffee, timber.

**Gibb, SIR ALEXANDER** (b. 1872). British engineer. Born at Broughty Ferry, Feb. 12, 1872, he was educated at Rugby and at University College, London. Taught by Wolfe Barry and H. M. Brunel, he was consulting engineer for works in the U.K., Europe, India, China, Persia, Canada, Australia, and S. America. He was civil engineer-in-chief at the Admiralty, 1918-19, and consulting civil engineer to the ministry of Transport, 1921; advised the Canadian government on the administration of its national docks, and was consulting engineer for the Singapore naval base and the new dock at Sydney. Gibb was knighted in 1918 and awarded the silver jubilee medal in 1935. He published a book on Telford, 1935.

**Gibbet** (Fr. *gibet*, crooked stick). Type of gallows having a projecting bar, formerly used, principally, for hanging executed male-factors in chains as a warning to passers-by, hence the term "to gibbet." Gibbets were usually erected at the scene of a crime.

**Gibbon (Hyllobates).** Smallest of the anthropoid or man-like apes. Rarely more than 3 ft. high, it is readily distinguished from the other anthropoids — the gorilla, the chimpanzee, and the orang utan — by its small



Gibbon. Specimen of the Silver Gibbon  
Gambier Bolton, F.Z.S.

slender build, its remarkably long arms, and by small naked callosities on the buttocks. It is the only anthropoid that walks on its hind legs without difficulty, balancing itself either by holding its long arms outstretched or by clapping its hands behind the neck.

There are several species, all of them found in Malaya and the surrounding countries. In colour they vary from black to grey, and some individuals tend to become lighter as they grow older. They live in the trees, and are by far the most agile of the anthropoids, leaping through the air with such speed as to catch birds on the wing. Their food consists of fruit and young shoots, insects, and the eggs and nestlings of birds. In the forests they are extremely noisy, uttering mournful cries in the morning and evening. In captivity they are gentle and easily tamed, and have been known to change colour. See Anthropoid Apes.

**Gibbon, EDWARD** (1737-94). English historian. The eldest son of an M.P. in the time of Walpole, he was born at Putney, April 27, 1737. Both his grandfathers were merchants in London, and he was brought up in surroundings of comfort and ease. At seven he had a private tutor, at nine he went to a school at Kingston, and at eleven to Westminster, but he owed much to an aunt, Catherine



After  
Sir Joshua Reynolds



Porten, who took charge of him after his mother's death in 1747.

In 1752, after two years spent under tutors, for his health was not equal to the regular life of Westminster, Gibbon went to Oxford, entering Magdalen College; but he did not trouble to turn his abilities into the conventional channels, occupied himself mainly with gaieties, and pronounced his period of residence wholly unprofitable. In 1753 he joined the Roman Church. His angered father took him away from Oxford and sent him to Lausanne, where for five years he lived with a Calvinist pastor and read widely and steadily. In 1758 he returned to England, and lived for a time at his father's house at Buriton. He took a commission in the Hampshire militia, which involved periodical drilling, and was captain when he retired in 1763. In 1761 he published in French his first book; *An Essay on the Study of Literature*. In 1763 he set out upon a tour of Europe. In Rome, on Oct. 15, 1764, the idea of the *Decline and Fall* came to him.

In 1765 Gibbon returned home from Italy, kept his great idea constantly in mind, but did not actually begin work on it until, after his father's death in 1770, he moved from Buriton to London.

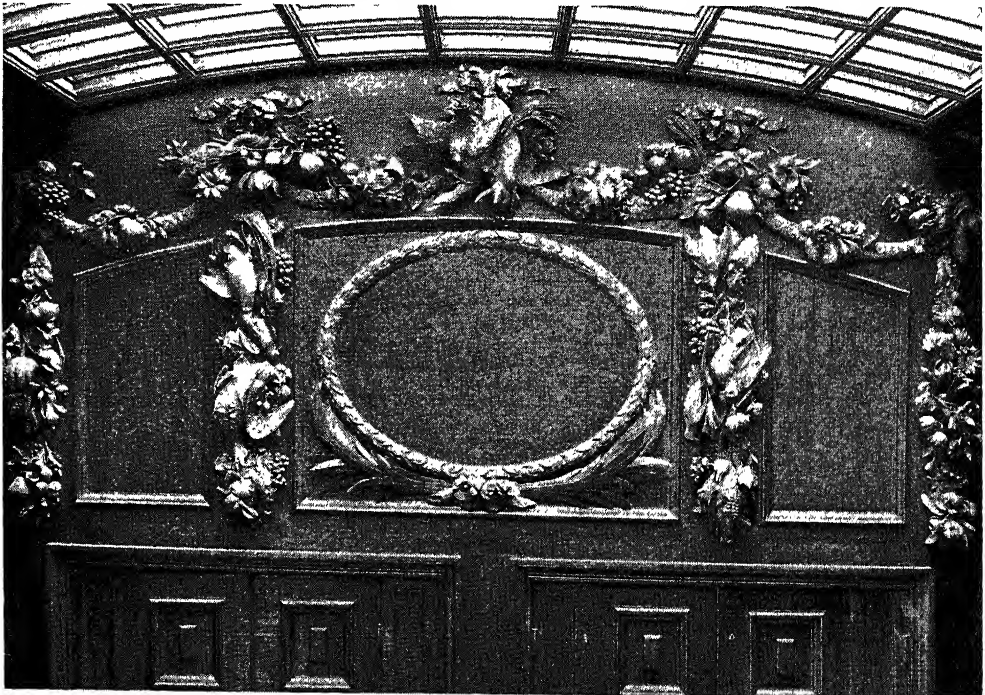
When in Feb., 1776, the first volume of the *Decline and Fall* was published, it was an instant and complete success, and he continued, pausing only in 1779 to reply, in a *Vindication*, to those who had criticised chapters 15 and 16 on Christianity. In 1774 he had been returned to the house of commons for Liskeard, and in 1780 he was returned for Lymington. In 1783, having resigned his seat, he joined a Swiss friend, Georges Deyverdun, at Lausanne, and there he lived until 1793. The *Decline and Fall* was finished June 27, 1787, and, as he tells in a great passage of his autobiography: "A sober melancholy was spread over my mind by the idea that . . . what-ever might be the fate of my History, the life of the historian must be short and precarious." The last three volumes were published in 1788.

Again in England, Gibbon spent some time in Sussex with his friend Lord Sheffield, but he was in London for an operation when he died Jan. 16, 1794. His remains were buried at Fletching, Sussex. He was never married. At Lausanne, in 1757, he became engaged to Susan Curchod, afterwards the wife of Necker; but his father forbade the match, and, as he says, "I sighed as a lover, I obeyed as a

son." His delightful autobiography occupied his last years.

Gibbon may be described as the greatest of modern historians. Ranke, and probably Acton, knew more; Ranke and Lecky wrote more; but when the qualities of the ideal historian are estimated, Gibbon excels them all. To knowledge, industry, and judgement he added an English style which can be compared only with that of Burke, and a power of generalisation that amounts to genius. His acquaintance with the literature of his subject was amazing even when his years of steady reading are remembered. On the other hand, it must be said that the latter part of his history has certain faults; it is a sketch, unequal to the earlier part in knowledge, accuracy, and a sense of proportion, while later research has shown his point of view in one or two instances to be distinctly wrong. *Consult* *Decline and Fall*, ed. J. B. Bury, 7 vols., 1909-13; *Lives*, J. M. Robertson, 1925; G. M. Young, 1932; R. B. Mowat, 1936; D. M. Low, 1937; M. Joyce, 1953; *Letters*, ed. J. E. Norton, 3 vols., 1956.

**Gibbons**, GRINLING (1648-1720). English carver and sculptor. Born at Rotterdam, April 4, 1648, of Dutch parentage, he practised his art in England, whither



Grinling Gibbons. Carving, with detail of game, birds, and fruit, in the western recess of the State ante-room, Windsor Castle, 1677-78. This room was originally the "King's Eating Room"



Grinling Gibbons,  
English carver  
After Kneller

Wren for Gibbons, whose carved decorations in S. Paul's (the choir stalls) and other Wren churches are particularly noteworthy.

Other fine works are at Blenheim Palace, Chatsworth, Petworth, Belton House (Grantham), Gattton. There is a throne carved by him at Canterbury. He carved foliage, fruit, and floral designs with extraordinary delicacy, and produced also several statues of merit, including those of Charles II at Chelsea Hospital, and of James II, at one time in Whitehall, moved in 1948 to a site outside the National Gallery. He died Aug. 3, 1720, and is buried in S. Paul's, Covent Garden. See James II illus.

**Gibbons, JAMES** (1834-1921). American cardinal. Born July 23, 1834, at Baltimore, he entered the R.C. priesthood in 1861, was appointed bishop of Richmond, Virginia, 1872; archbishop of Baltimore, 1877, and was made cardinal by Leo XIII in 1886.



The second U.S. cardinal, he was the first to participate, in 1903, in the election of a pope. His chief work was *The Faith of Our Fathers*, 1871; he helped to found the Catholic University of America at Washington, 1884. He died at Baltimore March 24, 1921.

**Gibbons, ORLANDO** (1583-1625). English composer, born at Cambridge, Dec. 25, 1583; most distinguished of three brothers, all musicians, sons of William Gibbons, one of the town musicians or waits. First a chorister at King's College, Cambridge, he made his reputation by composing a fantasia. In 1604 he was appointed organist of the Chapel Royal,



Orlando Gibbons,  
English composer  
From an old print

he came as a boy, and is usually classed with the English school. John Evelyn, struck by his carving, 1671, of Tintoretto's Crucifixion, obtained the patronage of

London, and in 1623 of Westminster Abbey. His compositions, which include church music, madrigals, and instrumental music, place him amongst the greatest of early English composers. He died of apoplexy at Canterbury, June 5, 1624, whither he had gone to produce his music for the wedding reception of Henrietta Maria by Charles I. His son Christopher (1615-76) was successively organist of Winchester Cathedral and Westminster Abbey.

**Gibbs, JAMES** (1682-1754). A British architect. Born at Aberdeen, Dec. 23, 1682 he studied at Rome under Carolo Fontana. Coming to London in 1709, he designed and built S. Mary-le-Strand, 1714-22, and added the steeple to Wren's church of S. Clement Danes, 1719. The church of S. Martin-in-the-Fields, his masterpiece, was built during 1722-26, and other noted works were the Radcliffe Library, Oxford, 1737-47; S. Peter's, Vere Street, 1721; and All Hallows', Derby, 1723-25. The friend and disciple of Wren, Gibbs was slavishly faithful to the classic models, but his buildings



James Gibbs,  
British architect  
After Hogarth

are finely proportioned. He died at Aberdeen, Aug. 5, 1754.

He died at Aberdeen, Aug. 5, 1754.

**Gibbs, SIR PHILIP HAMILTON** (b. 1877). British author. Born May 1, 1877, he became a journalist in 1902, holding editorial appointments on the *Daily Mail*, the *Daily Chronicle*, and the short-lived Liberal newspaper the *Tribune* (q.v.). In 1912 he was war correspondent with the Bulgarian army, and won fame during the First Great War as correspondent with the French and Belgian armies, 1914-15, and the British army, 1915-18. For this work Gibbs was knighted in 1920. He edited the *Review of Reviews*, 1921-22. He published memoirs, contemporary history (with special reference to the emotions of war-time), and novels; among the last, *The Street of Adventure*, based on his experiences in Fleet Street, was most notable. Later came *The Middle of the Road*, 1922; *Heirs Apparent*, 1923; *The Wings of Adventure*, 1930; *The Long Alert*, 1941. The *Pageant of the Years*, 1946, and *Crowded Company*, 1949, are autobiographical.



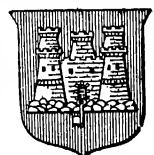
Sir Philip Gibbs  
British author

**Gibeah**. Royal city of Saul (1 Sam. 13, v. 16) identified with the site Tell el Fûl, 3 m. N. of Jerusalem. Excavations by the American Schools of Oriental Research in 1922-23 and 1933 uncovered a small Bronze Age settlement, destroyed and rebuilt, probably by Saul, as a small fortress-city c. 1000 B.C.

**Gibeon**. City of Palestine in Biblical times, identified with the modern El Jib, 5 m. N.N.W. of Jerusalem, and described in the Old Testament as "one of the royal cities"; its remains cover 16 acres. Excavations in 1956 revealed the massive city wall and a reservoir which is perhaps the pool mentioned in 2 Sam., 2, as the site of the contest between the men of Abner and Joab.

**Gibraltar** (anc. Calpē). Town and rock fortress at the S. extremity of Spain, a British possession. The rock juts out into the Mediterranean as an attenuated peninsula, ending in Europa Point.

The town is



Gibraltar arms



Gibraltar. Map of the Rock and harbour from the Spanish Lines to Europa Point

divided into two sections—the North Town and the South Town. The North Town is the meaner part of Gibraltar, with narrow and crooked streets. In 1947 the upper portion of the fortress was turned into a public park.

The principal buildings are the Anglican cathedral of the Holy Trinity, built in Moorish style, and

wind, or Levanter. The town is of great importance as a coaling station. The harbour, of 260 acres, can accommodate the Mediterranean fleet. The Rock of Gibraltar and Jebel Musa (anc. Abyla) on the African coast were called by the ancients the Pillars of Hercules.

Gibraltar ranks as a crown colony and is administered by a

the fortress of Gibraltar was the base for naval and air operations controlling shipping through the Straits and along trade routes to S. America, W. Africa, and the Cape. On the loss of the French naval bases, it became the sole Allied W. Mediterranean base.

Shortly before and during the war the fortifications were strengthened, new heavy and A.A. batteries being installed. Extensive tunnelling accommodated underground emplacements, hospitals, barracks, and stores. The racecourse was converted into an aerodrome. In July, 1940, some 15,000 women and children were taken off, the majority going to England.

In September the fortress was raided by some 50 (Vichy) French aircraft, as a reprisal for the Allied assault on Dakar, and two powder magazines were exploded. In Oct., Italian midget submarines attacked the harbour without doing any damage. The people returned 1944–51. Pop. (1951) 23,232.

**Gibraltar, SIEGES OF.** Military operations conducted by the

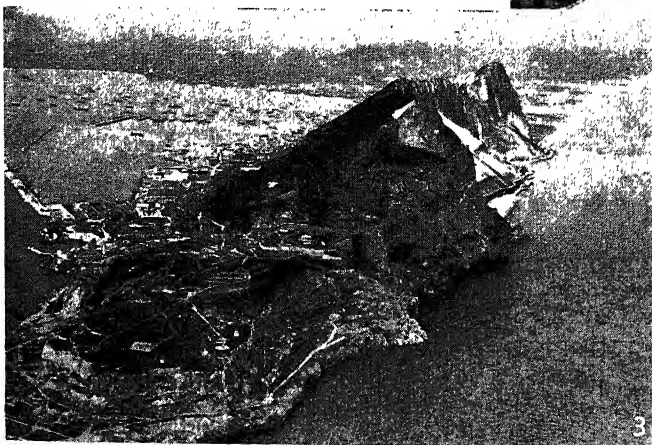


consecrated in 1832; the church of the Sacred Heart of Jesus; the castle, built by the Moors, and the governor's residence.

Gibraltar is connected with the mainland by an isthmus, 3 m. long and 1 m. broad. Between the British Lines and the Spanish Lines is a tract of neutral uninhabited ground. Just S. of the British Lines are rifle ranges, a racecourse, and cemeteries. The mole on Gibraltar Bay affords secure anchorage for the largest vessels. The haven is adequately sheltered from the dangerous E.

governor, an executive council (inaugurated 1922), and a legislative council (inaugurated 1950). This last, presided over by the governor, has three ex officio, five elected, and two nominated members.

During the Second Great War



Gibraltar. 1. General view of the town. 2. The Rock, showing the road to Spain. 3. View from above Europa Point, looking north, showing the fortifications and the harbour

British, the Spaniards, and others. Several sieges of this dominant rock are recorded before the appearance of the British in 1704. It was taken by the Moors in 711, and they were deprived of it by the Castilians in 1309. The Moors soon recovered it and held it against several attempts made by the Christians. The latter, however, recovered it in 1462, and the next sieges were due to the desire of one Spaniard to oust another.

In 1704 a British and Dutch fleet under Sir George Rooke, with an army of 30,000 men on board, was sent against Cadiz. At the last minute Gibraltar was substituted for Cadiz, and on July 22 the fleet appeared in the bay. Some marines were landed and the place was bombarded for six hours; at the end of that time the garrison,

under 500 men, offered to surrender. Gibraltar thus became British, July 24 (O.S.), 1704. It cost 61 men killed and 252 wounded.

In the autumn the Spaniards, aided by their French allies, began an attempt to recover the fortress. This siege lasted until April, 1705, and was marked by a daring attempt to surprise the place, and by several naval encounters. In 1736 the Spaniards tried again, but with equal unsuccess, and then came the siege of 1779-83.

Gibraltar at this time was defended by Sir G. A. Elliott, afterwards Lord Heathfield. The French and Spanish fleet got into the bay and the blockade began. The fortress was assailed also by land, and extensive siege works were constructed. A good deal of damage was done by the besiegers, while British ships from time to time succeeded in attacking the enemy. The garrison was in great difficulties when, in June, 1780, Rodney got provisions through.

Again provisions ran short, but in April, 1781, a British fleet arrived with supplies. A terrific bombardment was tried, but the defenders maintained position and in Nov. partially destroyed the siege works by a sortie. The final attack was made in Sept., 1782. An army of 40,000 men was collected, while off the bay was a strong French and Spanish fleet. Floating batteries were built, and from sea and land a continuous and heavy bombardment was maintained, to which Elliott replied with red-hot shot. On the 13th the attack was pressed desperately, but the battering ships at length were set on fire and great loss was inflicted upon the attacking force. On Feb. 6, 1783, the siege was raised. *Consult History of the Siege of Gibraltar, J. Drinkwater, 1905.*

**Gibraltar, STRAIT OF.** Channel separating the S. of Spain from the N. of Africa, and leading from the Atlantic to the Mediterranean. It has a surface current, which flows from the Atlantic, and an underlying current, which flows from



Gibraltar. Map of the strait which separates Europe from North Africa

the Mediterranean. At its narrowest point the strait is nearly 9 m. wide; its length from E. to W. is about 35 m.

**Gibraltar Fever.** Endemic or epidemic disease caused by a micro-organism, conveyed by goat's milk. *See Undulant Fever.*

**Gibson, CHARLES DANA (1867-1944).** American draughtsman and painter. Born at Roxbury, Mass., Sept. 14, 1867, he studied in New York and Paris. He began as a draughtsman in black and white for periodicals and magazines, and made a great hit by introducing to illustrated literature his own type of female beauty, which



Chas. Dana Gibson, American artist

became specifically named "The Gibson Girl." Later he took up portraiture. Among his books may be mentioned *London, 1896*; *Pictures of People, 1896*; *The Education of Mr. Pipp, 1899*; *The Americans, 1900*; *The Social Ladder, 1902*. In 1920 he became proprietor of *Life*. Died Dec. 23, 1944.

**Gibson, MARGARET DUNLOP (d. 1920).** British scholar. The younger twin daughter of John Smith, of Irvine, Ayrshire, in 1883 she married the Rev. James Gibson, translator of Cervantes' poetry. Both she and her sister, Mrs. Agnes Lewis, paid a number of visits to Syria and Palestine. In 1892, when at the convent on Mt. Sinai, they photographed the Syriac palimpsest of the Gospels (Codex Sinaiticus), and in 1896 brought to England the first leaf of the Hebrew Ecclesiasticus. They presented the site for Westminster Theological College at Cambridge. Mrs. Gibson wrote *How the Codex was Found, Studia Sinaitica, Apocrypha Arabica, Didascalia Apostolorum, and Commentaries on Acts*. She died Jan. 11, 1920.

**Gibson, WILFRID WILSON (b. 1878).** English poet, born Oct. 2, 1878. His earliest published work was *Wilyn the Harper, 1900*, and at frequent intervals he issued collections of poems, a comprehensive one in 1926. Later volumes were *Islands, 1932*; *The Alert, 1941*; *Challenge, 1942*; *The Outpost, 1944*. Gibson is content with traditional forms and diction. His best-known lyric is *Lament, beginning*

We who are left, how shall we look again  
Happily on the sun or feel the rain.

**Gibson Gallery.** Hall in Burlington House, Piccadilly, London. The exhibits comprise the original sketches and casts of the chief



Charles Dana Gibson. An illustration from *The Education of Mr. Pipp*. The nouveau riche, taken to a concert by his wife and daughters, typical Gibson girls, fails to take any friendly interest in the great composers

works of a Welsh sculptor, John Gibson (1790–1866), and examples of his marble sculpture bequeathed to the Royal Academy. Gibson was elected A.R.A. in 1833 and R.A. in 1838 but worked for many years in Rome. He was an advocate of the ancient Greek practice of introducing colour into sculpture.

**Gichtel**, JOHANN GEORG (1638–1710). German mystic. Born at Ratisbon (Regensburg), March 14, 1638, he studied theology and Oriental languages at Strasbourg. For some years he practised as a lawyer, and in 1665 was banished for attacking the Lutheran doctrine of justification by faith. Three years later he founded the celibate sect of Angelic Brethren, who aimed at a life of angelic purity. He died Jan. 21, 1710.

**Giddiness** or **VERTIGO** (Lat. *vertere*, to turn). Sensation of lack of balance, which may be associated with reeling or staggering. Giddiness may be experienced in normal health after rapid rotation of the body as in dancing; at stepping on an insecure surface; or on looking down from a height.

A common pathological cause is some disorder such as wax in the external ear, or some condition of the middle ear. Giddiness is a constant symptom of many affections of the brain, like cerebral haemorrhage, tumours, and thickening of the cerebral arteries. Cardiac inadequacy, causing poor blood supply to the brain, is an obvious cause. Excess of alcohol or tobacco may produce giddiness. Local conditions of the eye form yet another group of causes. The aura, the premonitory indication of an epileptic fit, frequently takes the form of giddiness.

**Gide**, **ANDRÉ PAUL GUILLAUME** (1869–1951). French novelist, essayist, and dramatist. Born in



André Gide,  
French novelist

Paris, Nov. 21, 1869, he was educated at the École Alsacienne and the Lycée Henri IV there. His first work, *Les Cahiers d'André Walter*, 1891, appeared anonymously at his own expense; *Le Voyage d'Urien*, 1893; *Paludes*, 1895; *Les Nourritures Terrestres*, 1897, followed. These were studies in advance of their time for psychological subtlety. In his novel *L'Immoraliste*, 1902, Gide established his reputation as a writer of unusual power and originality.

An amoralist, advocating a highly charged, unafraid attitude towards life, he was influenced by Nietzsche and Dostoevsky, and he became a leader for writers of the 1920s. *La Porte Étroite*, 1909; *Les Caves du Vatican*, 1914; *La Symphonie Pastorale*, 1919; *Si le Grain ne Meurt*, 1920 (which is autobiographical); *Les Faux-Monnayeurs*, 1926, took a definite place in French literature. Gide's plays included *Saul*, 1903; *Betsabé*, 1912; *Oedipe*, 1931. His translations ranged over Shakespeare, Tagore, Conrad, Pushkin.

Publication of his *Journals* began in 1930. Many of his works have appeared in English translations. He lived in Tunis during the Second Great War. A member of the French Academy, he won the Nobel prize for literature in 1947. He died Feb. 19, 1951.

**Gideon**. Hebrew judge and warrior. The son of Joash, he appears to have been born at Ephraim in Manasseh. Called by God to deliver Israel from the Midianites, he overthrew the altars and groves of Baal. By an ingenious night alarm he threw the Midianite army into confusion and routed it. He refused the throne, but judged Israel for about 40 years, and is said to have had 70 sons. The obscure and partly inconsistent O.T. account of him (Judges 6–8) probably consists of two or more traditions unskillfully combined by a late editor.

**Gielgud**, **SIR (ARTHUR) JOHN** (b. 1904). British actor and theatrical producer. Son of Frank Gielgud and Kate Terry Lewis, and nephew of Ellen Terry, he was born April 14, 1904, educated at Westminster, and studied at the R.A.D.A. He played his first part as the Herald in *Henry V* at the Old Vic, 1921, joined J. B. Fagan's repertory in 1924, and succeeded Noel Coward in *The Vortex*, 1925. Three years later came his début in New York. Triumphant Shakespearian seasons at the Old Vic, 1929–30, made him the most-talked-of young actor, as Prospero and King Lear especially, and in 1934 he scored an even greater success as Hamlet in his own production at the New Theatre.

Some of Gielgud's most elegant and thoughtful performances were as John Worthing in *The Importance of Being Earnest*; Inigo Jollifant in *The Good Companions*; Richard II in *Richard of Bordeaux*; Valentine in *Love for Love*; Joseph Surface in *The School for Scandal*; Trigorin in *The Seagull*; and (his favourite part) Vershinin in *The Three*

*Sisters*. As a producer he was happiest with comedy, e.g. *Concree*, Wilde, and Maughan, in seasons at the Haymarket Theatre, 1943–46. An autobiography, *Early Stages*, appeared 1938. He was knighted 1953; and in 1957 produced



Sir John Gielgud,  
British actor

a full-length version of Berlioz's *Les Troyens* at Covent Garden.

His brother, Val Henry Gielgud, was born April 23, 1900, and educated at Rugby and Trinity College, Oxford. Joining the B.B.C. in 1928, he became next year its director of drama. He wrote radio plays, film scenarios, and novels.

**Gien**. Town of France, in the dept. of Loiret. It stands on the right bank of the Loire, 40 m. E.S.E. of Orleans. An old place, its interest is mainly antiquarian. It has some old houses, a 15th century bridge across the Loire, and a château, now used as a palais de justice. In the town there is a gigantic statue of the valiant Gallic chief Vercingetorix.

**Gierke**, **OTTO FRIEDRICH** (1841–1921). German jurist. Born at Stettin, Jan. 11, 1841, Gierke studied at Heidelberg and Berlin, and afterwards lectured on law. He became professor of German law at Breslau in 1872, in 1884 was transferred to Heidelberg, and in 1887 to Berlin. Of Gierke's writings the most important is *German Society Law* (*Genossenschaftsrecht*), 1887. In this and other books he developed the idea that groups within the state, guilds and the like, have their own bodies of law, their own personality, and rights. Gierke died Oct. 10, 1921.

**Giesebrecht**, **WILHELM VON** (1814–89). German historian. Born in Berlin, March 5, 1814, he became one of Ranke's pupils, and before 1840 published his first historical work, a monograph on Otto II. In 1857 he was made professor of history at Königsberg, and in 1862 at Munich, where he died Dec. 17, 1889. Giesebrecht's main contribution to history is his unfinished *History of the Empire* (*Kaiserzeit*), 1881–90, a study of the medieval empire to the time of Frederick I; it is an exact piece of scholarship. His other works include a translation of the *History* of Gregory of Tours, 1851.

**Giesecking**, **WALTER WILHELM** (1895–1956). German pianist. Born at Lyons, France, Nov. 5, 1895, he



begin to play the piano at the age of four, but received no regular musical training until 1911 when



Walter Gieseking.  
German pianist

he studied with Leimer at Hanover. He gave his first concerts just before the First Great War, and after 1920 toured Europe and the U.S.A., first appearing in England in 1923. Among his compositions were songs, piano solos, and chamber works. He died in London Oct. 26, 1956.

**Giessen.** Town of W. Germany, in the *Land* of Hesse, on the Lahn, 34 m. N. of Frankfurt-on-Main. A town 1248, Hessian 1265, Giessen is famous for its University, founded in 1605, which had international importance as the working place of Liebig, professor of chemistry, 1824-52. Attached to it and its impressive new buildings, clinics, laboratories, and library (574,000 vols. and MSS.), is a botanic garden founded 1609. The town has fine old timber-frame houses of the 14th-16th centuries, a gabled town hall, two 16th century palaces, an armoury, and in the vicinity five old castles, four in ruins. Tobacco, machinery, iron, and rubber industries existed before the Second Great War. Pop. 35,913.

**Gifford, WILLIAM** (1756-1826). British writer and controversialist. Son of a glazier, he was born at Ashburton, Devon. Left an orphan at 12, he became first a cabin boy on a coasting steamer, and then apprentice to a shoemaker. Devoting his spare time to the study of mathematics and verse writing, he attracted the notice of a surgeon named Cookesley, who raised a fund on his be-

half; with this he was sent to Exeter College, Oxford, after which he travelled on the Continent.

On his return Gifford published in 1794 and 1795 two satires, *The Baviad*, a paraphrase of the first satire of Persius, which castigated the Della Cruscan (*q.v.*), and *The Maeviad*. He edited *The Anti-Jacobin*, 1797-98, so much to the satisfaction of the Tories that he was given two government appointments worth together £900 a year. His *Epistle to Peter Pindar* (*Dr. Walcott*), 1800, was followed by his *Autobiography* and a verse translation of Juvenal, which, with that of Persius, 1821, remains unrivalled in vigour.

As editor of *The Quarterly Review*, 1809-24, he bitterly attacked Keats, Hazlitt, and what was known as the Cockney School of Poetry. He edited the dramatic works of Massinger, 1805-13, Ben Jonson, 1816, and Ford, 1827.



Giessen, Germany. The Liebig Museum, a building used as a laboratory by Justus von Liebig, 1824-52

He died Dec. 31, 1826, and was buried in Westminster Abbey. *Consult* Life, R. B. Clark, 1931.

**Gifford Lectures.** Course of lectures on natural theology, in connexion with the universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews. It was founded by Lord Gifford (1820-87), Scottish judge and philanthropist, who left £80,000 between the Scottish universities. The lecturers have included W. James, A. J. Balfour, Sir J. G. Frazer, W. R. Inge, Bergson, and Andrew Lang.

**Gift.** In English law, the promise to make a gift, except by deed, is not enforceable. But once the gift is completed, it is

irrevocable unless it has been obtained by duress, fraud, or undue influence. A gift is complete only when every legal step has been taken to pass the property to the donee. For example, "I give you my watch, or this freehold house" means nothing in law unless the watch is handed over or the freehold conveyed by deed.

**Gifu.** Town of Japan, on the island of Honshu. It is the capital of the Gifu prefecture, 70 m. E.N.E. of Kyoto. Silk and paper goods are industries. Pop. 172,340.

**Gig.** Word suggesting lightness and speed applied to a two-



Gig of British admiral, manned by naval officers

wheeled vehicle drawn by one horse. It is also used of a clinker-built racing boat, and of a narrow ship's boat propelled either by oars or by sails. *See* Carriage.

**Gigantes.** In Greek mythology, a race of giants who sprang from the blood of Uranus as it fell to the earth when he was mutilated by Cronos. The chief of the Gigantes were Alcioneus, Enceladus, and Porphyryon. They warred with Zeus and, ultimately defeated with the help of Hercules, some were buried under volcanoes. This legend, however, seems to confound the Gigantes with the Titans (*q.v.*).

**Giggleswick.** Parish and village of the W. Riding of Yorkshire, England. It stands on the Ribbles, 14 m. N.W. of Skipton, and has a rly. station, but is nearer Settle station. Near are stone and slate quarries. It is known for its large public school; founded in 1512, this received a charter from Edward VI in 1553. The school has five houses with accommodation for over 200 boys. A total eclipse of the sun was observed here on June 29, 1927, by the party of the astronomer royal.

**Gigli, BENIAMINO** (b. 1890). Italian singer. Born March 20, 1890, at Recanati, Marches, he was educated there, and studied under Rosati at the Rome conser-



Beniamino Gigli,  
Italian singer



vatoire, making his début at Rovigo in La Gioconda, 1914. He created the tenor part in Mascagni's Lodoletta and Puccini's La Rondine in Italy and S. America. A leading singer in Italian opera at the Metropolitan, New York, he first came to Covent Garden in 1930, scoring a triumph with his lyrical singing in Tosca and Martha. He made several successful concert tours in the U.K. *Consult* Memoirs, English translation, 1957. *Pron.* gee-lyee.

**Gijón** (anc. Gigia). Seaport of Spain, in the prov. of Oviedo. It stands on the Bay of Biscay, 11 m. N.N.E. of Oviedo, at the terminus of various Asturian rlys., about midway between the ports of Bilbao and Corunna. It has a commodious harbour, with quays, arsenal, a curious 15th-century church, palace, and the Jovellanos Institute with a fine art collection. The town retains its medieval walls.

Among the exports are minerals, fish, nuts, fruit, butter, and cheese, while glass, liqueurs, tobacco, soap, chocolate, and tinned goods are manufactured. The Moors rebuilt the fortifications with stones from the Roman city. Gijón repelled the Normans in 844, was burnt down in 1395, but is now a prosperous town and popular seaside resort. In the Spanish civil war of 1936-39 it was the last government stronghold on the northern (Asturian) front to fall, Oct. 21, 1937; miners maintained further resistance near by. Pop. (1950) 110,985.

**Gila.** River of the U.S.A. Rising in New Mexico on the slopes of the Sierra Madre, it flows S. and W. through Arizona, and enters the Colorado at Yuma near the Mexican border. For upwards of half its course of about 480 m. it passes through mountainous country, and precipitous cañons.

**Gila Monster** (*Heloderma suspectum*). Popular name for the heloderm, the only venomous lizard known. It is common in Texas and Mexico, and lurks in ruins where it feeds upon frogs, eggs, and insects. Its bite is not fatal to man, though injurious.

**Gilbert.** River of Queensland, Australia. It rises near the Gregory Range, about 20 m. S. of Gilberton, and flows N.W. to the Gulf of Carpentaria after a course of 230 m.

**Gilbert.** Group of small islands and atolls in the Pacific Ocean. They lie on the equator, between long. 171° and 171° E., S.E. of the Marshall Islands. The chief are Butaritari, Makin, Abaia, Mara-kei, Tarawa, Maiana, Kuria, Abemama, Ananuka, Tapiteuea, No-

nouti, Nikunau, Onotoa, Beru, Tamana, and Arorae. Total area, 166 sq. m. Eighteen islands are inhabited; they yield pandanus fruit and coconuts, and export copra and phosphates. Pop. (1953) 30,521, chiefly Micronesians.

Proclaimed a protectorate in 1892, the islands were annexed by Great Britain at the request of the natives, Nov. 10, 1915, and with other groups make up the Gilbert and Ellice Islands colony.

Early in 1941 the Japanese occupied most of the Gilbert Islands, establishing air and naval bases on Makin and Tarawa. On Aug. 17 a small force of U.S. marines landed on Makin and destroyed the Japanese seaplane base. Following a prolonged bombardment, U.S. marines invaded Makin and Tarawa on Nov. 20, 1943. Makin was captured with little loss, but Tarawa proved a costly victory, for out of 4,500 men, 1,026 were killed and 2,557 wounded in the 76-hour battle. The Japanese garrison of 5,000 was annihilated. This occupation provided a stepping stone to the recapture of the Marshall Islands.

**Gilbert** (c. 1110-89). English saint and founder of the Gilbertines (*g.v.*) He was born at Sempringham, Lincs, of which he became rector, and where he founded in 1135 the only monastic order of English origin, for both sexes. He was imprisoned on a false charge of sending help to Becket in exile. He died at Sempringham, and was canonised by Pope Innocent III.

**Gilbert, Sir Alfred** (1854-1934). British sculptor. Born in London, Aug. 12, 1854, he studied at Heatherley's, and the Beaux Arts, Paris. In 1882 he first exhibited his Kiss of Victory at the Royal Academy, where Icarus followed in 1884. Gilbert's best-known work was the Shaftesbury memorial fountain (Eros) at Piccadilly Circus, a work that by reason of its position became famous throughout the world. Other well-known sculptures included the Alexandra memorial at St. James's; statue of John Bright at Westminster, and of Queen Victoria at Winchester; the duke of Clarence memorial at Windsor; and many busts. But Gilbert rated his designs as a goldsmith more highly than his sculpture. Elected R.A., in 1892,



Sir Alfred Gilbert,  
British sculptor  
Elliott & Fry



Sir Alfred Gilbert. The aluminium figure, popularly called Eros, surmounting the memorial to the 7th earl of Shaftesbury in Piccadilly Circus, London, W.1

he retired in 1909, having been professor of sculpture from 1900. Knighted in 1932, he died Nov. 4, 1934. *Consult* Alfred Gilbert, I. McAllister, 1929.

**Gilbert, Sir Humphrey** (c. 1539-83). English navigator. Born at Dartmouth, stepbrother of



Sir Humphrey  
Gilbert,  
English navigator

in the operations in Ireland, being given command of the prov. of Munster in 1569. Knighted in 1570 and M.P. for Plymouth in 1571, he was sent the following year to the Netherlands, where he failed against the Spaniards.

Gilbert then mostly resided in Limehouse until 1583, when with two vessels he sailed to Newfoundland, landed at St. John's, and founded the first English colony in America. He insisted on setting out on the return voyage aboard the smaller of his two vessels, the Squirrel, a frigate of only 10 tons. The little craft foundered off the Azores with all hands, Sept. 9, 1583. The story, told by the commander of the Golden Hind, has become immortal through Gilbert's encouragement of his company with the words, "We are as near to Heaven by sea as by land." *Consult* Life, D. B. Chidsey, 1932.

**Gilbert, Sir John** (1817-97). British painter and illustrator. Born at Blackheath, July 21, 1817, he entered a city office, but

after two years he abandoned business for art. He was almost entirely self-taught. From 1836 onwards he exhibited at the British Institution, Royal Academy, and other galleries, although between 1851 and 1867 he showed at the Academy a solitary picture (1867). His real *métier* was the illustration of books and periodicals. His drawings (829 in all) for Howard Staunton's edition of Shakespeare (1856-60) became deservedly famous, and a complete set of the proofs found an appropriate home in the print-room of the British Museum. Sir Walter Scott and Cervantes he also illustrated with extreme felicity, and for nearly thirty years he was the mainstay of *The Illustrated London News*.

In 1852 he became associate, and in 1854 full, member of the Royal Society of Painters in Water Colour, being elected its president in 1871, when he received a knighthood. He was elected A.R.A. in 1872, and R.A. in 1876. His preference of subjects was still governed by his old relish for literature and history, among his best works in oils being *King Charles Leaving Westminster Hall* (1872), *Naseby* (1873), *Richard II Resigning the Crown to Bolingbroke* (1876), and *The Doge and Senators of Venice*. Sir John was well represented in the Guildhall Gallery, London. He died at Blackheath, Oct. 5, 1897.

**Gilbert, Sir Joseph Henry** (1817-1901). British chemist. Born at Hull, Aug. 1, 1817, he studied chemistry in London and under Liebig at Giessen. From 1843 until his death, Dec. 13, 1901, he was director of Rothamsted Laboratory in collaboration with Sir J. B. Lawes. He was elected F.R.S. in 1860, and was knighted in 1893, on the jubilee of the Rothamsted experiments, which covered a large field of research in agricultural science. He was also professor of rural economy at Oxford, 1884-90.

**Gilbert, Marie Dolores Eliza Rosanna** (1818-61). Irish dancer, better known by her stage name of *Lola Montez* (q.v.).



*John Gilbert*

**Gilbert, Sir William Schwenk** (1836-1911). British playwright. Born in London, Nov. 18, 1836, he was educated at London university. From 1857 he was a clerk in the education department of the privy council office, and in 1863 was called to the bar. After 1860 he contributed articles and drawings to *Fun*, in which his *Bab Ballads*, 1869 and 1873, appeared, and he started his career as dramatist by writing half a dozen burlesques, including a travesty of Tennyson's *The Princess*. These were followed by three fairy plays, *The Palace of Truth*, 1870, *The Wicked World*, 1873, and *Broken Hearts*, 1875; a classical romance, *Pygmalion and Galatea*, 1871; and two farcical comedies, *Tom Cobb*, 1875, and *Engaged*, 1877. He also wrote plays of serious interest, such as *Dan'l Druce*, 1876; *Gretchen*, 1879; *Comedy and Tragedy*, 1884; and *Brantingham Hall*, 1888.

The remarkable series of comic operas, in the production of which he as librettist was associated with Arthur Sullivan as composer and Richard D'Oyly Carte as theatrical manager, started in 1875, and the partnership endured, with lapses, until 1896 (see Gilbert and Sullivan). To the wit and finish of his dialogue and lyrics, the urbanity of his satire, and his exploitation of the humours of topsy-turveydom, which added the word *Gilbertian* to the language, much of the original success of the operas was due. Gilbert, who was knighted in 1907, was drowned in his private open-air swimming pool while going to the aid of a lady guest in difficulties, May 29, 1911.

**Gilbert and Sullivan.** Term in general use to define the output of one of the most remarkable partnerships in the history of creative art, that of W. S. Gilbert (v.s.) and Arthur Sullivan (q.v.) in the series of comic operas first produced under the management of Richard D'Oyly Carte between 1875 and 1896. Gilbert wrote the libretti, Sullivan composed the music, and in spite of fundamental differences in temperament and more than once to open quarrel, each inspired the other to greater achievement than was possible to each separately (though

neither would have agreed to this, particularly Sullivan, who had high ambitions as a serious composer and chafed at the popularity of his most delightful melodies). The full Gilbert and Sullivan repertory is as follows:

<i>Gaiety Theatre</i>	
Thespis (an early collaboration of historical interest only.)	1871
<i>Royalty Theatre</i>	
Trial by Jury	1875
<i>Opéra Comique</i>	
The Sorcerer	1877
H.M.S. Pinafore, or The Lass that Loved a Sailor	1878
The Pirates of Penzance, or The Slave of Duty	1880
Patience, or Bunthorne's Bride	1881
<i>Savoy Theatre</i>	
Iolanthe, or The Peer and the Peri	1882
Princess Ida, or Castle Adamant	1885
The Mikado, or The Town of Titipu	1885
Ruddigore, or The Witch's Curse	1887
The Yeomen of the Guard, or The Merryman and his Maid	1888
The Gondoliers, or The King of Barataria	1889
Utopia, Limited, or The Flowers of Progress	1893
The Grand Duke, or The Statutory Duel	1896

Of these, *The Mikado*, the first production of which ran for 672 performances, remains generally the most popular. The original run of *H.M.S. Pinafore* was 700 performances; of *Patience*, 578; of *The Gondoliers*, 554; of *The Yeomen of the Guard*, 423. Composer and librettist alike were most satisfied with *The Yeomen of the Guard*. *The Grand Duke*, greatly inferior to the rest, was played only 123 times and has never been revived. The operas are sometimes called the *Savoy operas*, and sometimes (because the D'Oyly Carte family owned the copyright until 1961) the *D'Oyly Carte operas*. Their popularity waxes and wanes. During the early years of the 20th century it is fair to say that they were more popular in the provinces than in London, but notable revivals in the West End in 1919-20 restored their appeal in London during the years between the wars. Amateur operatic companies have always remained faithful to Gilbert and Sullivan. But many critics tire of the highly stylised and mechanical stage actions which were first insisted upon by Gilbert, from which no departure is allowed, thus turning what should be spontaneous fun into something like a ritual. A film version of *The Mikado* (1939) was an experiment that would bear repetition. On the other hand, the true lover of Gilbert and Sullivan would not willingly dispense with the least of the tradi-



Sir William Gilbert, British dramatist

tional gestures or "business." The criticism that the style of humour is more suited to the suburban drawing-room than to the stage may have some sound basis but is not necessarily detrimental, except perhaps to the stage. The fact remains that the public still flocks in its thousands to see, hear, and enjoy Gilbert and Sullivan. A film, *The Story of Gilbert and Sullivan*, was made in 1952. *Consult* G. and S., A. H. Godwin, 1926; G. and S., Hesketh Pearson, 1937; *The G. and S. Book*, L. Baile, 1951.

**Gilbert Blane Medal.** Naval prize. It was founded in 1829 by Sir Gilbert Blane, a member of



Gilbert Blane Medal. Reverse and obverse sides of the naval prize medal

the board for sick and wounded seamen, to encourage the study of medicine in the navy. It consists of a gold medal presented biennially to each of the two medical officers who produce the most approved daily journals of their practice whilst in charge of a ship of war in the Royal Navy.

**Gilbertines.** English monastic order. It was founded by S. Gilbert of Sempringham (q.v.) about 1135. The order included both men and women, who lived in double monasteries having no communication. The men followed the Augustinian rule and the women the Cistercian. The habit was black, covered with a white cloak. S. Gilbert established 13 houses, containing some 700 canons and 1,500 nuns. The superior was called the master or prior general. *See* Abbey.

**Gilbey, Sir Walter** (1831-1914). British wine merchant. He was born at Bishop's Stortford, May 2, 1831, and entered the office of an estate agent. On his return from the Crimean War he founded with his brother Alfred the firm of W. and A. Gilbey, wine merchants. In 1893 Walter was made a baronet, and the title passed to his son on his death, Nov. 12, 1914.

Sir (Henry) Walter Gilbey (1859-1945), born Oct. 1, 1859, and educated at Harrow, took his

father's place in the sporting world. He was president of the London cart horse parade and of the Royal Agricultural Society. Always particular about his own clothes and affecting a bowler hat with a specially flaired brim, he condemned sartorial slackness in the public, particularly in those who rode in Rotten Row. He died April 11, 1945, being succeeded in the baronetcy by his grandson.

**Gil Blas** DE SANTILLANE, HISTOIRE DE. French novel, by Le Sage (q.v.), a masterpiece of picaresque literature. The first two parts appeared in 1715, the third in 1724, and the fourth in 1735. Le Sage adopted the Spanish picaresque romance of the 16th-17th centuries, and he adhered closely to the spirit of the Spanish scene and character. He was accused by Voltaire and others of having borrowed incidents and characters from Espinel's *Marcos de Obregon*, 1618.

**Gilboa** (bubbling fountain). Chain of hills beside the plain of Esdraelon, Palestine. Saul and his sons were slain in battle here.

**Gildas** (c. 516-570). British historian. His work, *Liber Quercus de Excidio Britanniae*, or Lament over the Destruction of Britain, traces the history of Britain from the Roman invasion to the writer's own time, and has slight literary and doubtful historical value, but is without a contemporary. He is known also as a Breton saint, two monasteries having been founded in his honour in Brittany.

**Gilding.** The application of a thin layer of gold alloy as a decorative treatment. It is widely used for sign-writing on wood and glass fascias and on shop windows and commercial motor bodies; also in architectural decoration as a finish for wood and plaster mouldings on walls and ceilings of an ornate character. Gilded mouldings and figures were a feature of late French Renaissance decoration.

In sign-writing, the lettering is first painted in size slightly stained with yellow chrome, or with a special writers' size. When the size is almost dry the lettering is gilded by pressing on gold leaf transfers. On completion the gilding is lightly polished with a wad of cotton wool. If the lettering is outlined or shaded in oil paint, this is done after gilding. When the sign or ground is varnished, this should be done before gilding, as gold is more durable

and withstands weather better than varnish.

Wood letters are first prepared by washing, glass papering, and one-coat french polishing. They are then treated with oil gold size and when nearly dry are gilded. This is best done on the bench. Mouldings and picture frames are treated similarly.

**Gilead.** Mt. district of Biblical Palestine, lying to the east of the river Jordan. In it the tribe of Gad appears to have settled. Elijah was the most notable of its sons. *See* Balm.

**Giles** (Lat. Aegidius). Patron saint of lepers and beggars. He is said to have been born at Athens at the end of the 7th century, and to have emigrated to France, where he became a hermit near Nîmes. He founded an abbey, which was called by his name.

**Giles, Ernest** (1839-97). British explorer. Born in Bristol, he went to Australia as a youth,



Ernest Giles, British explorer

and between 1872 and 1882 made explorations into the interior. In the first of these he started from about 134° E. long., 25° S. lat., and proceeded N.W. as far as

Lake Amadeus. In 1873 he journeyed from the Alberga River and followed the 27th parallel to 126° E. long.

His most successful journey was in 1874, when, at the end of Sept., with a well-equipped party and numerous camels, he left Fowler's Bay, and after many vicissitudes reached Perth on Nov. 13.

In 1876 he again traversed the continent. Leaving Pia Springs, in 27° 7' S. lat., 116° 45' E. long., on April 10, and travelling to the 23rd parallel, he made a general N.E. course, crossing the headwaters of the Murchison, passing Mt. Gould, and tracing the Ashburton river to its source. He reached Peake Station Aug. 23. Towards the end of 1882 he explored the country W. of the Peake. Giles wrote *Geographic Travels in Central Australia*, 1875; *Australia Twice Traversed*, 1889.

**Giles, Herbert Allen** (1845-1935). British scholar. Born Dec. 8, 1845, he was educated at Charterhouse, and joined the China consular service in 1867. He was vice-consul at Pagoda Island, 1880, and Shanghai, 1883, and consul at

Tamsui, 1885, and Ningpo, 1891. Resigning in 1893, he became professor of Chinese at Cambridge, 1897-1932, and was first lecturer on Chinese at the Dean Lung Foundation, Columbia University. In addition to his *Longinus*, 1870, he was the author of numerous works on the language, literature, art, and religion of China, including a *History of Chinese Literature*, 1901; *The Civilization of China*, 1911; *Confucianism and Its Rivals*, 1915; *Introduction to Chinese Art*, 2nd ed. 1918. He compiled a Chinese-English dictionary, 2nd ed. 1912. He died Feb. 13, 1935.

His 4th son, Lionel Giles (b. Dec. 29, 1875), was educated at Liège, Feldkirch (Austria), Aberdeen University, and Wadham College, Oxford, and became keeper of Oriental printed books and manuscripts at the British Museum, retiring in 1940. He published many books on China and translations from the Chinese, including *The Sayings of Lao Tzu*, 1904; *The Sayings of Confucius*, 1907; *The Book of Mencius*, 1942.

**Gilfillan, GEORGE** (1813-78). British author. Born at Comrie, Perthshire, Jan. 30, 1813, son of a secession minister, he was educated at Glasgow University. In 1836 he became minister of School Wynd Church, Dundee, where he remained till his death, Aug. 13, 1878.

During 1845-54 he published three series of critical estimates entitled *A Gallery of Literary Portraits*. He wrote *Lives of Scott*, 1870, and *Burns*, 1878.

**Gilgal** (Heb., stone-circle). A name given in the O.T. to various places. At one, near Jericho, a place of sacrifice in the days of Samuel, Saul gathered his people against the Philistines. At Gilgal Samuel hewed in pieces Agag the Amalekite.

**Gilgamesh**. Hero of a Babylonian epic, king and legendary builder of Erech. In the 12 books of the epic, corresponding more or less closely to the months of the year, his adventures are set forth; he is a man of mighty strength, a great hunter who defeats the monster Enkidu and becomes his friend, and overcomes the giant Humbaba. Gilgamesh incurs the enmity of the goddess Ishtar; he journeys to the land of the dead,

and the account of that journey gives occasion for narrating the Babylonian version of the story



Gilgamesh, the Babylonian Hercules, strangling a lion  
From a sculpture in the Louvre, Paris

of the Flood. Episodes from the story of Gilgamesh were favourite themes in Babylonian and Assyrian art. Consult *The Epic of G.*, R. Campbell-Thompson, 1930.

**Gilgit**. District, town, and river of Kashmir. Lying on the S. slopes of the Hindu Kush, the dist. includes the valleys of Gilgit, Chitral, Swat, and Ladak. Area 25,000 sq. m. The town stands at 4,900 ft. a.s.l., 125 m. N.N.W. of Srinagar. A British agency 1889-1947, it is linked with Peshawar by air and a rough motor road.

**Gilia**. Genus of annual herbs of the family Polemoniaceae, native to the warm, but not tropical, regions of America. They have abundant flowers, funnel or salver shape, blue, rose, yellow, purple, white, etc.

**Gill**. Organ of respiration in animals that habitually live in water and do not rise to the surface to inhale air. Gills are found in fishes, crustaceans, many molluscs, the larval stages of batrachians and some insects, and in many aquatic forms of life. They are so constructed as to present

the largest possible surface containing capillary blood-vessels to the water in order that the oxygen it contains may be brought into contact with the blood. Gills vary in their structure from simple slits in the body wall to more or less elaborate plates, filaments, and leaf-like organs. The gills in fish and many other animals are situated at the sides of the head or neck, but in some crustaceans they are found on the limbs; certain echinoderms carry them on the tentacles. No vertebrates higher than fishes and batrachians breathe with gills in the adult stage, but gill clefts are present in an early stage of the development of the embryo. The gills of insects whose larvae pass most of their lives in water are called tracheal gills, because they are permeated by fine air tubes.

**Gill**. In engineering, the flat plate or fin fitted to the tubes of a radiator or water cooler in order to facilitate the dissipation of heat.

**Gill**. Dry and liquid measure of capacity used in Great Britain and the U.S.A. The gill quantity has always been in some doubt. Generally, the measure equals a quarter of a pint, but the word has been used in Scotland and N. England for half a pint, and in certain other districts for one pint. Gill is derived from the Late Latin *gillo*, a wine vessel. *Pron.* jill.

**Gill**. Lough or lake of Ireland. It is mainly in co. Sligo and partly in co. Leitrim; length 5 m., extreme breadth 2 m. It is navigable by small steamers. W. B. Yeats lived on an island of Lough Gill, which he made famous as *Innisfree*.

**Gill, (ARTHUR) ERIC ROWTON** (1882-1940). British sculptor and designer. Born at Brighton, Feb. 22, 1882. he studied architecture



Eric Gill. At work on his carved relief, Christ giving sight to Bartimaus, for Moorfields Eye Hospital, London

under Caroë but did not practise. Eric Gill's designs include the Stations of the Cross for Westminster Cathedral (*see* Art, illus. p. 637) and for the R.C. church at Bradford: the First Great War memorial for Leeds university; and the sculptured group on S. Thomas's Church, Hanwell. He executed the stone figures of Prospero and Ariel on the B.B.C. building, Langham Place, and the figure of the North Wind and its companion piece on the London Transport building, Broadway, Westminster. Examples of his sculpture are in the Tate Gallery and the Victoria and Albert Museum. His work is notable for a Giotto-like simplicity of design and boldness of execution. His Gill Sans type was perhaps the finest evolved in 100 years; a 3-vol. N.T. hand-set by him in this type was published in 1934. He designed the lettering used by W. H. Smith & Sons. The author of provocative essays on art and its relation to other subjects, he died Nov. 17, 1940.

**Gill, Sir David** (1843-1914). British astronomer. He was born at Aberdeen, June 12, 1843, and educated at Aberdeen university. On taking charge of Lord Lindsay's observatory he went out to Mauritius and observed the transit of Venus. In 1877, having determined at Ascension Island the solar parallax by a study of the movements of Mars, he received the gold medal of the Royal Astronomical Society. In 1882 he took fresh measurements of the transit of Venus, and photographed the great comet of that year. As H.M. astronomer at the Cape of Good Hope, 1879-1907, Gill carried out his greatest work, the magnificent catalogue of the stars of the southern hemisphere. This catalogue, comprising nearly half a million stars, was completed in 1900. He was created K.C.B. in 1900, and died Aug. 27, 1914.

**Gill, MacDonald** (1884-1947). British architect and designer. Younger brother of Eric Gill, he was born at Brighton, educated at The Royal Naval Academy, Bognor, and the Central school of arts and crafts, and became an architect. In 1913 he designed a well-known map of London for the Underground; later cartographical pieces for the L.M.S. rly. and the Empire Marketing Board were outstandingly successful. His mural decorations ornament Lincoln Cathedral, the Guildhall, Cambridge, and the Scott Polar Institute, and he worked as

designer to the Imperial War Graves Commission. He died at Chelsea, Jan. 14, 1947.

**Gillespie, Sir Robert Rollo** (1766-1814). British soldier. The son of a landowner in co. Down, he



Sir Robert Rollo  
Gillespie,  
British soldier

was born at Comber therein, Jan. 21, 1766. He obtained a commission in the army in 1783. In 1787 he killed a man in a duel and was tried for wilful murder, but the result was a verdict in his favour. In 1794 in San Domingo he fought as a volunteer for the French against the rebels. Gillespie's reputation rests upon his services in India, whither he sailed in 1805. He was made commandant of Arcot, from which he made his ride to Vellore, July 10, 1806. Hoisted up by a rope, he entered the fort and inspired the defenders to hold it until help arrived.

In 1811 Gillespie held a command in a force sent to Java, and led the attack on Batavia, but was involved in a serious quarrel with Sir Stamford Raffles, the governor. He was serving in a war against Nepal when he was killed leading a desperate rush on the fort of Kalunga, Oct. 31, 1814. Before this news reached England Gillespie was knighted.

**Gillette, King Camp** (1855-1932). American inventor, born Jan. 5, 1855. He became world-famous as the inventor of a safety razor, and was president of the Gillette Safety Razor Co., 1901-31. He was the author of Human Drift, 1894; Gillette's Social Redemption and Gillette's Industrial Solution, both 1900; The People's Corporation, 1924. He died July 10, 1932.

**Gillie**. Old name for a Highland manservant. It is now used to denote one who assists his master on deerstalking and fishing expeditions in the Scottish Highlands. *See* Deer-stalking.

**Gillies, Sir Harold Delf** (b. 1882). New Zealand surgeon. Born June 17, 1882, at Dunedin, he was educated at Wanganui College, Cambridge university, and S. Bartholomew's Hospital. One of the foremost plastic surgeons, as evidenced by his book, Plastic Surgery of the Face, 1920, he became consultant in that subject to the ministry of Pensions, the R.A.F., and the army in Great Britain, and civil consultant to the

Admiralty, besides holding a number of hospital appointments. He was knighted in 1930. He played amateur golf for England v. Scotland, 1908, 1925, 1926.

**Gillingham**. Market town of Dorset, England. It stands on the Stour, 23 m. W.S.W. of Salisbury, and has a railway station. The National Stud was moved to Gillingham Stud, Gillingham, from Tully, co. Kildare, Eire, 1944. The chief building is the church of S. Mary, the Virgin. Market day, Monday, Pop. 3,274.

**Gillingham**. Municipal borough of Kent, England. It stands on the Medway to the E. of Chatham, being 36 m. E.S.E. from London by railway. It has a fine Perpendicular church, parts of the building dating back to Norman times. It was made a borough in 1903, and includes the districts of Brompton and New Brompton. It is the centre of a fruit growing district, and has industries, making e.g. bricks and cement, while many of the inhabitants work in the dockyards of Chatham. There are parks and recreation grounds. The borough was made a bor. constituency under the 1948 redistribution. Gillingham existed in Anglo-Saxon times. It received its charter in the time of Edward III. William Adams (*q.v.*), first Englishman to settle in Japan, was born here. The R.N. barracks, Chatham, and a major part of Chatham dockyard are within the borough. Pop. (1951) 70,676.

**Gillingham**. Village of Norfolk, England, 1½ m. N.W. of Beccles. The church of S. Mary, pure early Norman, is divided into Galilee, tower space, nave, chancel, and apse. In the village also stands the tower only of the former All Saints church.

**Gillott, Joseph** (1799-1873). British penmaker. Born at Sheffield, Oct. 11, 1799, he served his



Joseph Gillott,  
British penmaker

time as a cutter. In 1821 he moved to Birmingham, where in 1830 he began experimenting in steel nib making. His first improvement was the introduction of side slits in addition to the centre slit, which made the nib more pliable. His next improvement was to cross-grind the point. So far all his work had been performed in secrecy, the finished nibs being sold to a stationer at the price

of a shilling each. In 1859 he opened a large factory, and the business soon became one of the largest of its kind. Gillot made a fortune, much of which was spent on a collection of pictures, which at his death was sold for £170,000. Died at Edgbaston, Jan. 5, 1873.

**Gillow, ROBERT** (d. 1773). English furniture maker and designer. Gillow set up a cabinet-making business at Lancaster about 1730, and opened a London house in 1761. The business was greatly developed by his sons, Richard, Robert, and Thomas, whose high standards of craftsmanship were worthy of the designs made for them, among others by George Hepplewhite, and from about 1790 to 1800 by Thomas Sheraton. Gillow and Barton, as the firm became, were credited with the introduction of the extra-leaves dining-table, and were the leading furniture makers of the 18th century in England.

**Gillray, JAMES** (1757–1815). A British caricaturist. Born probably at Chelsea, of Scottish or Irish descent, he was apprenticed to a letter-engraver. Later he attended the R. A. Schools and studied engraving under W. W. Ryland and Bartolozzi. His aptitude for caricature, at first confined to social foibles, early displayed itself anonymously, but in 1779 his plate of Paddy on Horseback, published under his own name, announced his entrance into the political arena.

From this date until he died, virtually demented, in London on June 1, 1815, he produced no fewer than 1,500 pieces, mostly caustic. He spared no one. He assailed George III and his queen as ruthlessly as William Pitt, Charles James Fox, and other leaders, and the public vociferously applauded all. His pictures of social manners and customs are invaluable to the historian. See Caricature illus. p. 1770.

**Gillyflower.** Name originally applied to carnation (*Dianthus caryophyllus*), but now used chiefly for stocks (*Mathiola*) and wallflower (*Cheiranthus*). It is a corruption of Fr. *giroflée*, which is derived from Gr. *karyophyllon*, nut-leaf, clove-tree, in reference to the clove-like smell. See Stock; Wallflower.

**Gilman, DANIEL COIT** (1831–1908). American educationist. Born at Norwich, Conn., July 6, 1831, he was educated at Yale, New Haven, and Berlin universities. He became librarian and, in 1856, professor of physical and political geography at Yale; he was president of the university of California, 1872–75. He helped to found Johns Hopkins university, Baltimore, and was first president, 1875–1901. Among other posts he held that of executive officer of the geological survey of Maryland.

His books include *University Problems*, 1898; *James Monroe in His Relations to the Public Service* (1776–1826), 1883; *The Launching of a University*, 1906. He edited *De Tocqueville's Democracy in America*, and was one of the general editors of the *New International Encyclopaedia*, 1902–4. He died Oct. 13, 1908. *Consult Life*, F. Franklin, 1910.

**Gilman, HAROLD JOHN WILDE** (1876–1919). English painter. He was born at Road, Somerset, Feb. 11, 1876, and studied at the Slade school, London. Influenced at first by Sickert, he later became a follower of Van Gogh and a pure colourist; in choice of subject he adhered to still life and interiors reminiscent of the Dutch masters. As the virtual originator of the Camden Town Group, 1911, and as first president of the London Group, 1914, he had considerable influence on 20th century English painting. He died Feb. 12, 1919.

**Gilmour, SIR JOHN** (1876–1940). British politician. He was born May 27, 1876, and educated at Trinity College, Glenalmond; Edinburgh university; and Trinity Hall, Cambridge. Having served in the S. African War, Gilmour entered parliament in 1910 as Unionist member for E. Renfrewshire. He succeeded his father as the 2nd baronet in 1920. Secretary for Scotland, 1924–29, he was minister of Agriculture in the National government formed in 1931, and Home secretary, 1932–35. Appointed minister of Shipping, Oct., 1939, he died suddenly March 30, 1940. He was created G.C.V.O. in 1935.

**Gilolo.** Alternative name for Halmahera (*q.v.*), island in the Moluccas.

**Gilpin, BERNARD** (1517–83). English divine and philanthropist, known as the apostle of the North. Born at Kentmere, Westmorland, he was educated at Queen's College, Oxford and ordained 1542. He studied at Paris and Louvain, and became archdeacon of Durham

and rector of Houghton-le-Spring, where he died March 4, 1583. Here he founded a grammar school, and became famed for his beneficence. He was offered the bishopric of Carlisle, but declined it. He spent his later years in journeying about the district, preaching and relieving distress.

**Gilpin, JOHN.** The hero of the mock ballad, *The Diverting History of John Gilpin*, by William Cowper. It describes how Gilpin, linen-draper and train-band captain, but a poor horseman, attempted to follow his wife and family to Edmonton on horseback, but was carried on to Ware, whence, with equally diverting adventures, he was carried back to London. The poem was based on an anecdote of a Mr. Beyer, of Paternoster Row, told to the poet by Lady Austen.

**Gilsonite.** A lustrous, black asphaltite, named after an American, S. H. Gilson. It has a specific gravity of 1.03 to 1.09, a softening point between 250° F. and 500° F., and a high dielectric strength. The mineral content is less than 1 p.c. Gilsonite occurs in veins which vary in thickness up to several feet, and is found in E. Utah and W. Colo., U.S.A. It is a valuable raw material for the varnish and japan industry and is also used as a thermoplastic. Smaller quantities are used in the electrical industry, in the manufacturing of some printing inks, and for impregnating belting and other materials.

**Giltspur Street.** A London thoroughfare running N. from the Old Bailey to W. Smithfield. An approach to the old jousting ground at Smithfield, hence its name, it contained, 1791–1855, a comptor, or debtors' prison, at the S.E. corner. On the same side are parts of the G.P.O. and S. Bartholomew's Hospital, with, in the yard of the former, and below the surface, a bastion of the old Roman wall.

**Gilyak.** Primitive tribe of palaesiasitic stock found in the R.S.F.S.R. in Khabarovsk territory, Soviet Far East, and in S. Sakhalin. Short, stocky, and round-headed, they occupy in the winter pit-huts and in the summer pile-houses. They are skilful boatmen, hunt with bow and arrow, and subsist mainly on salmon and sturgeon. Their animism includes a bear-festival. They are sometimes called Nivkhi.

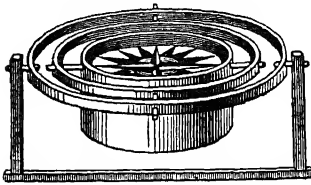
**Gimbals.** Arrangement of rings and pivots to allow relative motion of the pivoted member in two planes at right angles. Gim-



James Gillray,  
British artist



bals are used for the support of a mariner's compass so that this instrument may keep its level



Gimbals, device of brass rings for keeping a mariner's compass horizontal

position despite the rolling or pitching of the ship. A simple form of this arrangement is often seen in the toy gyroscope, while gimbals are used in a perfected form in the gyro-compass.

**Gimcrack Club.** Racing club. Founded in 1767, its name commemorates that of a famous race-horse. It holds an annual dinner at York, the rule being that the guest of the evening shall be the owner of the horse that wins the Gimcrack Stakes, a race run every Aug. at York.

**Gimli.** In Norse mythology, a great hall. It was of wonderful brightness, and the idea was that it would remain after the destruction of the world, to be for ever the home of the good.

**Gimmel Ring.** Two or more separable hooks which when linked together form a single finger ring. They were formerly popular as betrothal rings and ornamented with a device of two clasped hands or two hearts.

**Gimp** (Fr. *guimpe*, nun's wimple). Lace trimming stiffened with cords covered with silk or worsted. It is sometimes enriched with gold or silver, and usually of a rather open design.

**Gin.** Colourless or slightly tinged spirit flavoured with juniper berries and other aromatic herbs. It is distilled in a patent still, the grain used being maize, to which a little barley malt is added. The gin rectifier, as a rule, buys the neutral spirit, and then rectifies it. Sometimes it is rectified twice, and then naturally commands a higher price. It is flavoured by distillation with juniper berries, although occasionally essential oil of juniper is added to the rectified product. Each gin rectifier has his own recipes for flavouring, and very often in addition to juniper, almonds, cardamoms, cassia, orris-root, coriander seeds, or other aromatic flavourings are used. London gin is known all over the world, and another variety which

has a large sale is Plymouth gin, made, as the name implies, at Plymouth. The kind known as Old Tom is simply ordinary gin sweetened with cane sugar or sugar syrup. Gin as sold retail in the U.K. is usually of a strength of 30 degrees under proof. If sold below 35 degrees under proof the strength must be noted on the label. The formula, "contains — p.c. proof spirit," is sufficient to fulfil the requirements of the Act governing the sale of spirits. "Geneva," sometimes called holland, holland geneva, or schnapps, is simply Dutch gin. The name is derived from the Dutch word *jenever*, which means both juniper and gin. Geneva is principally made in Schiedam, Holland, on much the same lines as English gin. See Distilling.

**Ginger** (*Zingiber officinale*). Perennial herb of the family



Ginger. Horizontal rootstock with flowering shoots

Scitamineae. It is a native of the E. Indies. It has a horizontal rootstock, which forms the ginger of commerce. The leaves are narrow, lance-shaped, up to 1 ft. long. The yellow and blue flowers are clustered in a dense oval spike, on a tall, leafless stem. Preserved ginger consists of the young rootstocks preserved in syrup. The ordinary form, used as a spice, is the year-old rootstock, either skinned or unskinned. Ginger was used by the Greeks and Romans, and in India from remote antiquity.

**Ginger Ale.** Aerated beverage flavoured with ginger, acidulated with citric or other vegetable acid, and coloured with caramel. It is manufactured in the same way as soda-water, except that before water saturated with carbonic acid

is forced into the bottle, a small quantity of syrup flavouring is placed in it. This syrup contains citric acid, caramel, ginger ale essence, and sugar. The ginger ale essence, officially styled by the ministry of Food "unsweetened gingerale essence," is a compound of ginger, lemon, vanilla, and cinnamon, each manufacturer having his special proportions of ingredients, upon which the flavour of the product depends. Ginger ale is a clear, effervescing liquid, popular both as a temperance beverage and a dilutant for spirits.

**Ginger Beer.** Beverage flavoured with ginger and lemon, and produced by fermentation. If of normal gravity and containing not more than 2 p.c. of proof spirit, it is not regarded as "beer" or an "intoxicating liquor," and may be sold without an excise licence. As ginger beer is a cloudy liquid it is usually bottled in stone or earthenware bottles. The clear variety in glass bottles, entirely free of alcohol, is an aerated water, flavoured with soluble essence of ginger, and scarcely distinguishable from ginger ale.

**Gingerbread.** Cake flavoured with ginger. The chief ingredients are flour, butter or lard, eggs, and treacle. More elaborate recipes add candied peel, sweet almonds, cinnamon, etc. Gingerbread was made six centuries ago with rye flour, honey, and various spices, besides ginger. At one time small gingerbread figures of people and animals were sold by bakers, the figure decorated with gold paper being regarded by the children as the king of the others—hence the phrase "that takes the gilt off the gingerbread." Many towns have been noted for gingerbread fairs, at which small gingerbread cakes, known in East Anglia as "brown buttons," were sold.

**Ginger Wine.** Wine, not necessarily alcoholic, prepared from ginger, lemons, raisins, and sugar. More frequently nowadays it is prepared from the manufactured product known as "unsweetened gingerale essence." See Ginger Ale.

**Gingham** (Malay *ging-gang*, striped). Cotton or linen fabric woven from white or coloured yarn often in stripes, checks, or other designs, used for dresses, umbrellas, etc. Gingham was introduced into Europe from India. The patterns, though sometimes resembling those on calico, are woven in, not printed as on calico. Gingham is manufactured chiefly at Glasgow and Manchester, and in the U.S.A. Earlston, in Berwick-

shire, is still famous for its gingham. An umbrella, especially a large clumsy one, is sometimes colloquially called a gingham because umbrellas were formerly covered with that material.

**Gingivitis.** Inflammation of the gums. This can arise from pressure of an ill-fitting dental plate, or from vitamin shortage weakening the resistance of the tissues against germs. Stagnant food mixed with pus organisms may lie between the tooth and the gum, forming eventually a pocket of pus which loosens the tooth; this is known as pyorrhoecia. Air swallowing, with excessive salivation, may ensue, and this pus absorbed and swallowed—especially at night when there is no disturbance of its activities by food and no secretion of gastric juices to destroy it—is a frequent factor in cases of rheumatism, anaemia, and ulcerated conditions of the intestine. The prevention of gingivitis lies in oral hygiene (the gums as well as the teeth should be brushed), chewing crisp foods, and eating foods rich in vitamins. Cure lies in the use of penicillin, antiseptics, and in massage of the gums. In bad cases teeth must be removed.

**Ginkel, GODART VAN** (1630–1703). Dutch soldier. Son of a Dutch nobleman, he entered the army and saw service in the wars against France. In 1688, being then known as an able soldier, he crossed to England with William of Orange, under whom he also served at the battle of the Boyne. When the king returned to England, Ginkel was left in command in Ireland, where he captured Ballymore and Athlone. He was responsible for the English victory at Aughrim and for the captures of Galway and Limerick that ended the war. He continued his military career in the Low Countries, and, in spite of his age, led the Dutch in Marlborough's army in 1702. He died at Utrecht, Feb. 11, 1703. In 1692 (N.S.) Ginkel was made earl of Athlone, a title held by his descendants until 1844.

**Ginning.** Separation of cotton fibre from cotton seed by the gin (a corruption of engine). Bowing was the original process, the seed being struck by the string of a wooden bow. Roller gins with parallel fluted rollers were in use before 1793, when Eli Whitney's invention of the saw-gin ushered in a new era in the cotton trade.

**Ginsberg, MORRIS** (b. 1889). British philosopher and sociologist. Born May 14, 1889, he was

educated at University College, London, becoming lecturer in philosophy there, 1914–23. In 1929 he was appointed Martin White professor of Sociology at the London School of Economics. He became joint editor of *The Sociological Review*. Among his publications are *The Psychology of Society*, 1921; *Sociology*, 1934.

**Ginsburg, CHRISTIAN DAVID** (1831–1914). Polish Hebrew scholar. He was born at Warsaw and educated at the Rabbinical School, and later in England, where he made his home. He was a member of the O.T. revision committee and published a number of important works on the Hebrew scriptures, as well as contributions to encyclopedias and dictionaries. It was owing to him that the MSS. offered by Shapira to the British Museum were discovered to be forged. He died March 7, 1914.

**Ginseng** (*Panax ginseng*). Plant of the family Araliaceae. A native of N. Asia, it has com-



Ginseng. Leaves and flowers of the medicinal herb

pound leaves and greenish flowers in umbels. The name is Chinese, and signifies Wonder of the World, the physicians believing that the root restores lost animal functions, removes fatigue, and rejuvenates the old. See Araliaceae.

**Gioberti, VINCENZO** (1801–52). Italian philosopher and politician. He was born at Turin, April 5, 1801, where he became professor of theology. Exiled for his independent opinions, he withdrew to Paris. The events of 1848 brought him back to Turin, where he held various political offices. He afterwards returned to Paris, where he died Oct. 26, 1852. Gioberti, who may be called a Platonic idealist, endeavoured to reconcile the claims of science and religion.

His most important works were *Introduzione allo Studio della Filosofia* (Introduction to the Study of Philosophy), *Del Rinnovamento civile d'Italia* (the Civil

Renewal of Italy), and *Il Gesuita Moderno* (the modern Jesuit). Although he was a Catholic, his works, which were strictly orthodox, were placed upon the Index.

**Giono, JEAN** (b. 1895). French writer. Born at Manosque, Basses-Alpes, March 30, 1895, he was educated at Manosque College and became a bank clerk. He served in the First Great War. His first published work was a book of poems, *Accompagné de la Flute*, 1924. A trilogy *Présentation à Pan* (Coline, 1929; *Un de Baumugnes*, 1929; *Regain*, 1930) was followed by *Le Grand Troupeau*, 1931; *Jean le Bleu*, 1933; *Les Vraies Richesses*, 1936, and other novels, all inspired by the Provençal countryside and its people. In 1937 came *Refus d'Obéissance*, a call to pacifism. He continued to bring out novels during the German occupation, his attitude to which led to his being placed on the black list by the national committee of writers. He translated *Moby Dick*, and in 1940 published *Pour Saluer Melville*. He lived in retirement at Manosque, 1944–47. Then came *Les Ames fortes*, 1949; *Les Grands Chemins*, 1951; *Le Moulin de Pologne*, 1953. He wrote several plays—*Le Lanceur de Grain*, 1932; *Le Bout de la Route*, 1941; *La Femme du Boulanger*, 1944; *Le Voyage en Calèche*, 1947. Several of his works have been made into successful films.

**Giordano, LUCA** (1632–1705). Italian painter. Born in Naples, he studied under Giuseppe Ribera, and afterwards went to Rome and Venice. He painted in a free and animated manner, his composition was harmonious, his imaginative gifts were considerable, and his foreshortening daring and correct. He was summoned to Madrid in 1692 by Charles II to embellish the Escorial.

His nickname of *Fa Presto* was derived from his father's constant injunction to hurry up (Luca, *fa presto*—Luke, make haste). His best work is to be found in the Escorial, especially his decoration of the staircase, representing the Battle of St. Quentin. He was represented in most of the leading collections on the Continent, his Commerce and Navigation (Florence) being characteristic.



Luca Giordano. Italian painter From an etching



Giorgione. *The Storm*, a characteristic landscape with figures by this master of the Venetian school. The original is in the Giovanelli Gallery, Venice

**Giorgione**, GIORGIO (1477-1510). Venetian painter. Little is known of Giorgione, but he was probably born at Castelfranco Veneto, and is said to have been a pupil of Bellini. It is probable that he worked with Titian in painting frescoes in the Fondaco dei Tedeschi at Venice. Many works attributed to him have been disputed. The famous *Concert Champêtre*, in the Louvre, was the subject of a protracted argument, but is now generally considered to be by Giorgione. Other authentic works include *The Sleeping Venus* (formerly Dresden Gallery), *The Storm* (Giovanelli Gallery, Venice), *The Three Philosophers* (Vienna), probably finished by Sebastiano del Piombo. *The Concert*, in the Pitti Palace, Florence, has also borne the name of Giorgione.



Giorgio Giorgione, Venetian painter  
*Self-portrait*

One of the most important masters of the Venetian school, Giorgione drew direct from nature, and in his landscapes he reveals a profound feeling for light and shadow, rain and storm, thus breaking away from the stylised composition of the primitives. It is supposed that he died of the plague in 1510.

**Giotto di Bondone** (c. 1266-1337). Italian painter. The father of the Italian Renaissance, as he is considered to be, was born at

Colle, near Florence. It is probable that he was the son of Francesco Bondone di Vespignano, a well-to-do landed proprietor; that he was apprenticed to the wool trade; that he was in the habit of stopping at Cimabue's studio in Florence on the way to his work, and by this means called the master's attention to his genius.

Possibly Giotto may have become a pupil of Cimabue, but the naturalistic bent of his art from the first suggests that he owed more to the sculptor brothers, the Pisani, than to any painter, and more to first-hand study of nature than to any master. About 1298 his technical proficiency must have been achieved, for it was then that he designed the mosaic of the *Navicella* and painted the famous *Stefaneschi* altar-piece for S. Peter's, Rome. The former is now in the portico of S. Peter's, and most of

Francis's life in S. Croce Church, Florence, were executed considerably later.

One of his last works was the design made for the beautiful campanile of Florence cathedral.

These are the most notable extant examples of an art that broke away from the conventions of contemporary Byzantinism and opened the door to naturalism in form and colour. Giotto died at Florence, Jan. 8, 1337. *See Italy: Art; consult also* Lives, F. M. Perkin, 1902; B. de Sélincourt, 1905.

**Giovinezza**. Seaport of Italy, in the prov. of Bari, the ancient *Natium*. It stands on the N. shore of the Adriatic, 12 m. by rly. N.W. of Bari. A walled town, it possesses a 13th century cathedral and a fortified castle. Building stone is quarried in the neighbourhood, brandy is distilled, fishing-nets are manufactured, and fruits of many kinds and wine of excellent quality are produced.

**Giovinezza** (Ital., youth). Official song of Italian fascism. The original words of this catchy tune by Giuseppe Blanc were a love song by Nino Oxilia, a poet killed in the First Great War. Published about 1913, the song was sung, with verbal adaptations, in the trenches, and remained, with new words proclaiming fascism as the saviour of freedom, a favourite with unemployed ex-service men.

After the fascists obtained power, however, they discouraged the use of the word *freedom*, and the following official words still retaining the first two lines of the original poem, were set to the popular refrain:

Giovinezza, giovinezza,  
Primavera di bellezza,  
Non si piega e non si spezza  
Perché eterna Iddio la fa  
(Youth, youth, springtime of beauty, neither bends nor breaks because God makes it eternal).



Giotto di Bondone, Italian painter  
*From a print*



Giotto di Bondone. *The Ascension*, one of the famous series of frescoes painted in 1305 in the chapel of the *Madonna dell' Arena*, Padua

the latter—a triptych, with the central panel representing Christ Enthroned—in the *Sagrestia dei Canonici*. The more widely known frescoes of the Life of S. Francis in the Franciscan Church of Assisi were painted shortly after, and in 1303 he was commissioned by Enrico Scrovegno to decorate the chapel of the *Madonna dell' Arena* at Padua with frescoes of the History of the Virgin and Son. The mutilated frescoes of S.

They were by Federico Valerio Ratti. Throughout the regime Giovinezza was played compulsorily after the national anthem on all official occasions.

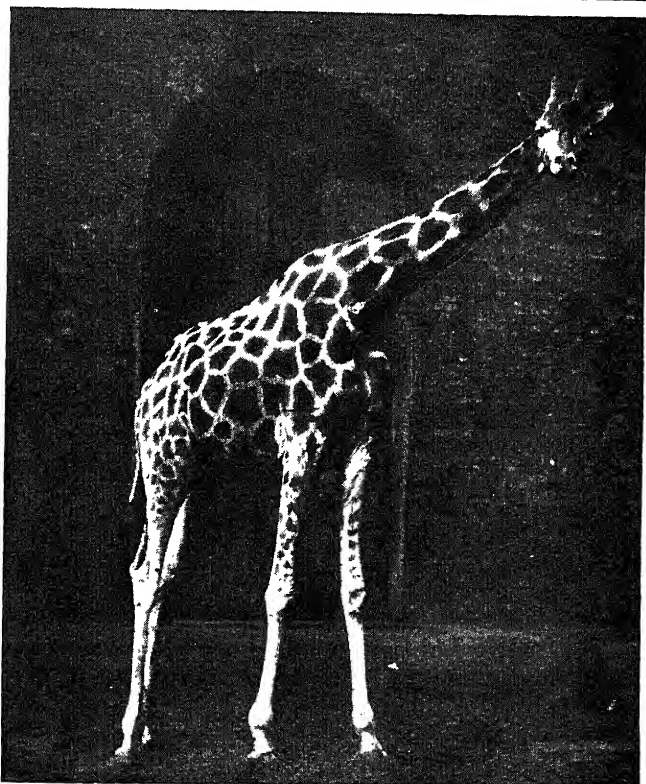
**Gippsland.** Province of Victoria, Australia. Its area is 16,700 sq. m. Rugged and mountainous, it was formerly heavily timbered with giant eucalyptus trees; large areas have been cleared and settled. Its coastal lake district consists of lagoons and sandy dunes. It is a rich agricultural area, dairying being a principal occupation. Silver, lead, copper, tungsten, molybdenite, platinum, osmiridium, and gold are found, and there are big deposits of bauxite. Coal is mined at Wonthaggi, where the state mine yields about 230,000 tons per annum. The great lignite (brown coal) deposits in N. Gippsland have been developed at Yallourn, where there is a state generating and briquetting plant. Chief towns are Wonthaggi, Sale, Bairnsdale, and Yallourn. It was named after Sir George Gipps (1791-1847), governor of N.S.W., 1838-46.

**Gipsy.** See Gypsy.

**Giraffe** (Arab. *zarāf*). Member of the even-toed ungulate or hoofed mammals, remarkable for the great length of its legs and neck. The body is comparatively short, the fore-quarters standing much higher than the hind ones, and the tawny pelt is handsomely marked with a network of light lines, the pattern varying considerably in local races. The long, narrow head is surmounted by a pair of short horns, or bony cores, covered by the skin. The tongue is remarkably long and is used to grasp the twigs and leaves of trees. Owing to the great length of the fore legs, the giraffe can only reach the ground with its mouth by straddling its legs widely apart. It has seldom been seen to graze.

Giraffes are found only in Central and S. Africa, chiefly in desert regions, where they have to subsist for long periods without drinking. There is probably only one species, divided into several local races or varieties. The animals are wary and timid, but when at bay can deliver formidable kicks with their long legs. Their gait when running is peculiar and clumsy, but they cover the ground at great speed. The flesh is eaten by the natives, and is of excellent quality.

**Giraffe Vehicle.** Vehicle designed for the invasion of France during the Second Great War. Giraffes could be driven ashore from landing craft on to the beach,



Giraffe. Male specimen of the Central African giraffe  
Gambier Bolton, F.Z.S.

the engine being raised over 7 ft. above ground. The chassis was that of a standard four-wheel drive truck with the cab, engine, and gear-box mounted on an upper frame, power being transmitted by a simple chain drive to the transfer box and thence to the road wheels in the normal way.

**Giraldus Cambrensis** (c. 1150 -c. 1222). Welsh historian. Born in Wales (Cambria) about 1150, he was given the name of Gerald, hence his name Giraldus Cambrensis. His father was William de Barri, and he is sometimes called Gerald de Barri. He studied in Paris, and entered the Church, becoming an archdeacon owing to the influence of his uncle, the bishop of St. Davids. He visited Ireland with Prince John, but most of his time was passed in clerical and political work in Wales. In 1198 he was chosen bishop of St. Davids, but the opposition of the archbishop of Canterbury prevented him from enjoying the dignity, although he tried hard to obtain the Pope's consent. His failure to obtain the bishopric, to which he had been elected once

before, was probably due to his independent spirit. He died probably in 1222. Giraldus wrote several works, two being on Ireland, one the story of its conquest by the English; he also wrote *Itinerarium Cambrense*. All have been published in the Rolls series, 8 vols., 1861-69. Consult Gerald the Welshman, H. Owen, new ed. 1904.

**Girandole** (Lat. *gyrus*, circle). Wall candelabra, or candle branches, attached to a mirror. They were used during the Directoire, Empire, and Georgian periods.

**Girardin, ÉMILE DE** (1806-81). French journalist and politician. Born at Paris, June 22, 1806, he early devoted himself to journalism for the masses, and in *La Presse*, 1836, inaugurated the cheap popular newspaper in France. To its columns his first wife, Delphine de Girardin (1804-55), contributed a brilliant series of sketches published under the title *Lettres Parisiennes* (1843). She was also the author of several romances and plays. As a politician Émile de Girardin first supported the Conservatives, but later became a Republican. He

also wrote some indifferent plays and a novel, *Émile*, 1827. He died at Paris, April 27, 1881.

**Girardot.** Town of Colombia, S. America, in the dept. of Cundinamarca. Connected by rly. with Bogota, the capital (102 m.), it is famous for its semi-annual cattle fairs. Coffee and hides are the principal export. Pop. 25,455.

**Girasol** (Ital. *girasole*, from *girare*, to turn, *sole*, sun). Gem which reflects bright red or yellow light apparently coming from its interior. The most remarkable form is the fire opal, which gives bright hyacinth, yellow, or fire-red reflections; the finest examples have been found at Zimapan, Mexico, and in the Faroe Islands. A sapphire, presenting a radiate flamboyant interior, and known as star sapphire or asteriated sapphire, found in India, has also the property of a girasol. At one time girasols were highly esteemed. They can be imitated artificially with facility. See Opal.

**Giraud, HENRI HONORÉ** (1879–1949). French soldier. Born in Paris, Jan. 19, 1879 he



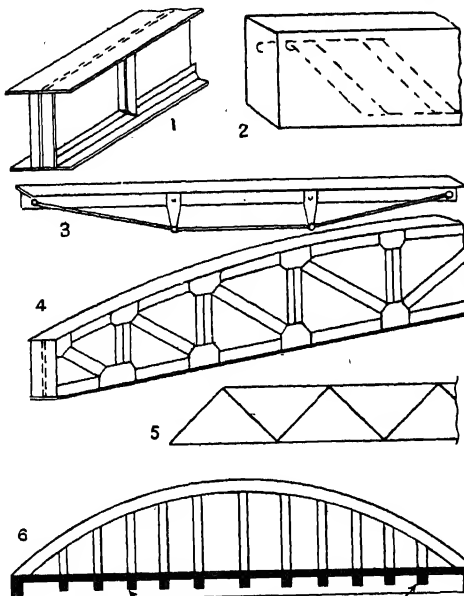
Henri H. Giraud,  
French soldier

went to St. Cyr military academy and the École Supérieure de Guerre. Captured by the Germans in the First Great War, he escaped and returned to the front. In the

Second Great War, Giraud commanded the French 7th army, and was captured by the Germans May 21, 1940, while trying to pull together the broken 9th army, after the German breakthrough at Sedan. He was interned in Königstein prison, but escaped in April, 1942, to Vichy France. The Americans believed Giraud could rally the French forces in N. Africa to the Allies, and the following November he was brought across the Mediterranean by British submarine and appointed c.-in.-c. by Darlan. After Darlan's assassination, Dec. 24, Giraud succeeded him as high commissioner of French N. and W. Africa. But he had insufficient support from the French. Roosevelt and Churchill arranged a meeting between him and de Gaulle (q.v.) at Casablanca, Jan., 1943, which resulted in June in the formation of the committee of national liberation under their joint presidency. In Nov., as a result of the committee's decision

to separate political and military authority, Giraud ceased to be joint president, but remained

constructed of riveted or welded steelwork or of reinforced concrete. Cast iron is no longer used



Girder. 1. Steel plate girder. 2. Precast reinforced concrete beam girder. 3. Trussed steel girder. 4. Hogback steel girder. 5. Warren girder (outline). 6. Reinforced concrete bowstring girder

c.-in.-c. until the post was abolished in 1944. He then refused that of inspector-gen. and was placed on the retired list. He was awarded the Médaille Militaire on the eve of his death, March 11, 1949, and was buried in Les Invalides.

**Giraudoux, HIPPOLYTE JEAN** (1882–1944). French novelist and dramatist. Born at Bellac, Haute Vienne, France, Oct. 29, 1882, he was educated at the École Normale, Paris. He entered the diplomatic service, then wrote novels (e.g. *Suzanne et le Pacifique*) and plays distinguished for satirical wit. Among his best known comedies are *Siegfried et le Limousin*, *Intermezzo*, *Supplément au Voyage de Cook*. His *Amphitryon 38* was translated into English and performed with success in London and New York. He was decorated with the Legion of Honour in 1936. He died in Paris, Jan. 31, 1944. Tiger at the Gates, Eng. trans. of his *La Guerre de Troie n'aura pas lieu*, 1935, was produced in London, 1955.

**Girder.** Built up beam or framework (not a rolled steel beam), constructed to take superimposed loadings and to transmit them to supporting walls, piers, or columns. Girders are usually

constructed of riveted or welded steelwork or of reinforced concrete. Cast iron is no longer used on account of difficulties in casting large units, and wrought iron on account of high cost relative to strength. For spans up to about 40 ft., reinforced concrete beam girders (rectangular or T section) are usually most economical; they can be precast or cast in place. Where a number of similar beams are required, higher strength in relation to weight can be secured by prestressing the reinforcement before the beam is cast. For larger spans, reinforced concrete girders are usually of the bow-string type, in which the upper member is in pure compression. In simply supported steel plate and steel frame girders, the upper flange is in compression and the lower flange is in tension; while shear stresses are resisted by the web plate (stiffened by angles or tees) on plate girders, and by tensile and compressive forces in the diagonal framing in framed girders. In continuous beams the compression and tension forces are reversed over the intermediate supports. Girders are used as the main beams in large steel-framed buildings, as crane or gantry beams in industrial engineering, and as the main members of bridges carrying roads and railways. See Bridge; Concrete; Engineering; Frame; Steel.

**Girdle.** Belt worn round the waist. Possibly the origin of all clothing, being worn by primitive man to carry weapons, it was later used to draw in loose outer garments, to keep up breeches or petticoats, or to carry weapons or other articles. From these practical uses an article of apparel developed that

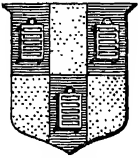


Girdle. Example, 1460, from a brass in S. Stephen's Church, Norwich

lent itself to rich decoration by armourer, broiderer, and goldsmith, and led to the formation of the Girdlers' Company (*q.v.*).

The use of the girdle to carry sword or dagger is very ancient. *Cingulum deponere*, to lay down the belt, was the Roman phrase for leaving military service; and in the days of chivalry his girdle was an elaborate part of the knight's equipment, heavily bossed and fastened with enamelled or jewelled buckles. In the 15th and 16th centuries civilian extravagance brought the girdle within the purview of the sumptuary laws. After the 16th century it gradually disappeared and now survives only in a few distinctively national costumes and makes ephemeral reappearances at the caprice of fashion.

**Girdlers' Company.** London city livery company. Originally a fraternity of girdle makers of



Girdlers' Company arms

S. Lawrence, it was incorporated in 1488 and united with the Pinners and Wire-drawers in 1568. The hall, 39, Basinghall Street, E.C., burnt with the archives in 1666, was rebuilt 1681-82, restored and altered 1878-79, but destroyed in the German fire-raising air raid Dec. 29-30, 1940. The company has offices at 22, St. Andrew Street, E.C.4. *Consult* Historical Account of the . . . Girdlers, W. D. Smythe, 1905.

**Giresun.** Town and vilayet of Turkey. The town is on the Black Sea, some 80 m. W. of Trabzon, and exports timber and hides. Lucullus introduced the cherry into Italy from this place when it was the Greek colony of Kerasos. The vilayet had a pop. of 334,701 in 1955.

**Girga.** Town, prov., and dist. of Egypt. The town is on the W. bank of the Nile, 313 m. S. of Cairo by rly. The prov. has an area of 576 sq. m. Pop. (est.) 1,300,000. The Nag' Hammâdi barrage, completed 1930, ensures supplies of water to the prov.

**Girgenti.** Corruption of the ancient Agrigentum long used as the name of the port of Sicily renamed Agrigento (*q.v.*) during the Fascist regime.

**Giriama** OR GIRYAMA. Tract of country S. of the Sabaki river in the British colony of Kenya. It extends inland for 40 m. behind the coastal fringe, over a length of 55 m., having water communica-

tion with Kalifi Bay. It is occupied by the Wagirima, a Bantu-speaking agricultural people allied to the Kikuyu and Pokomo. Their graded system of initiation, under tribal elders, is directed by a paramount council called Hyenas. The S. pastureland has been adversely affected by Masai raids. Cereal produce of the central region is of great economic importance.

**Girl Guides.** Association for the promotion of good citizenship through individual character training, and to help girls to develop physically, mentally, and spiritually. The movement, founded by the 1st Lord Baden-Powell and developed by his sister, Agnes Baden-Powell (1858-1945), is international. Starting in Great Britain in 1910, as a counterpart to the Boy Scout movement, it soon spread, and by 1939 32 countries were members of the world association. Beginning as Brownies (7½ to 11 years), girls become guides (11 to 16) and rangers (14 to 21). On enrolment a guide promises to do her duty to God and the sovereign, help others, and obey the guide law, which enjoins honour, loyalty, helpfulness, friendliness, courtesy, cheerfulness in difficulties, thrift, cleanliness of life. Maximum strength of a guide company is 36. The imperial h.q. of the Girl Guides Association is at 17-19, Buckingham Palace Rd., London, S.W.1. Olave, Lady Baden-Powell (b. 1889), became world chief guide in 1930. Elizabeth II, chief ranger of the British Empire from 1947 until her accession, 1952, became royal patroness of the association. World member-



Girl Guides' badge



Girl Guides. Two British members of this world-wide association

ship of the organization was 4½ millions in 1957.

**Girls' Friendly Society.** Body of girls and women who accept the Christian faith. Founded in 1875 by the Church of England, it is organized in parishes. Its aim is to unite girls and women in a fellowship of prayer, service, and purity of life. Girls may join as candidates at the age of seven, as prentices at 11, and as members after 12. It has a commendation system by which members are put in touch with the church, as well as the local branch of the society, when they are away from home. It runs a number of hostels, holiday homes, and camps. Associates, or leaders of the society, must be members of the Church of England, members may belong to any Christian denomination. The head office is Townsend House, Greycoat Place, London, S.W.1.

**Girls' Life Brigade.** Organization to provide girls with character and physical training, and recreation. Founded in 1902 by the National Sunday School Union, it numbered over 90,000 by 1956. A first condition of membership is loyalty to church and Sunday school. Study of the Bible and of missionary work is emphasised. Girls are admitted from the age of six. It organizes camping, swimming, rambling, cycling, and the study of first aid, hygiene, home-nursing, household management, child welfare, arts and crafts, literature, and music. Prospective officers take a short postal training course before receiving commissions. Its h.q. is at 8, Upper Belgrave Street, London, S.W.1.

**Girnar.** Sacred hill of India, in the Kathiawar peninsula, state of Bombay. It lies 10 m. E. of Junagadh. There are numerous Jain temples on the hill, which is one of the sacred places of the Jains—a bare, black rock of granite. In one place about 16 temples are grouped together. The hill has five principal peaks, the highest being Gorakhneth, 3,666 ft. above sea level.

**Girón,** OR JIRÓN. Town of Colombia, S. America, in the prov. of Santander. It stands on the river Lebrija, 10 m. S.W. of Bucaramanga, and 225 m. E. of Bogotá. It lies at an altitude of 1,850 ft. Cacao, coffee, quinine, tobacco, and alluvial gold are produced in the vicinity; and an image of Christ in the church is the object of a pilgrimage on Sept. 14 each year. The town was founded by Jesuits in 1631. Pop. (est.) 7,000.





Gironde. Map of the French department on the Bay of Biscay, showing the estuary of the Dordogne and Garonne rivers

**Gironde, La.** River estuary of France. It is formed by the union of the Garonne and the Dordogne, and is about 50 m. from there to its mouth in the Bay of Biscay. Its width varies from 2 m. to 6 m., and in spite of certain obstructions, large vessels can pass up it to Bordeaux. At its mouth is the Tower of Cordouan, a lighthouse standing on an island.

After the Allied landing in S. France on Aug. 15, 1944, the Germans retreated from the S.W. before the F.F.I. as their forces in the Rhône valley were pushed N. by the U.S. 7th army. The F.F.I. liberated Bordeaux on Aug. 31, but, in pursuance of their policy of preventing Allied use of French ports, the strong German garrison retreated to the mouth of the Gironde estuary, where they were contained by the F.F.I. until in April, 1945, troops of the French 1st army under General de Laminat were sent to attack them. More than 1,000 U.S. aircraft carried out a preliminary bombardment on troop concentrations and fortifications, and on April 15 a French naval force with Canadian and British support bombarded the coastal batteries on both sides of the estuary, while U.S. aircraft made another bombing attack, using liquid fire bombs for the first time in Europe. Later the same day French infantry and armour broke into the German lines on both banks of the river.

about the Gironde estuary, fronting the Bay of Biscay on the W., and this western section forms part of the district called the Landes, being a low and sandy plain containing several lakes and the bay or basin of Arcachon. The eastern part of the dept. is undulating and the soil very fertile. Cereals are grown, but the chief industry is the cultivation of the vine, and there are vineyards almost everywhere. From here come the varieties of wine known, from the districts in which they are grown, as Graves, Médoc, Sauterne, and others. The climate and soil are also favourable for fruit-growing generally, while many cattle are reared. Bordeaux is the capital of the department, which is divided into six arrondissements. Other towns are

Next day they captured Royan, which was found completely destroyed. All German resistance N. of the estuary ended on April 18. In the southern sector, the main German defence line was pierced on April 19; Pointe de Grave fell on the 21st, and the enemy was eliminated from the area on May 1 with the capture of the I. of Oléron just to the N. of the estuary. *See* Europe, Western: Its Liberation.

**Gironde.** Largest department of France. With an area of 4,140 sq. m., it lies

Blaye, Arcachon, Libourne, Pauillac, and St. Macaire. Pop. 858,381.

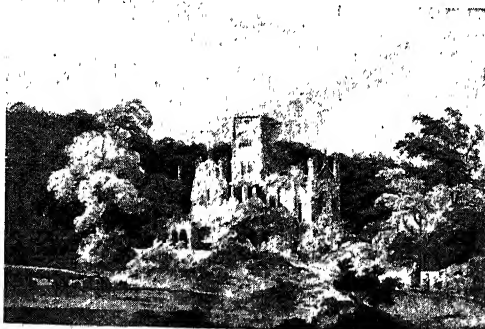
**Girondins** OR GIRONDISTES. Name given to one of the political parties of the French Revolution. It was given because several of its early members had represented the dept. of Gironde in the legislative assembly. Brissot (*q.v.*) was their leader; hence they were sometimes called Brissotins. Others were Condorcet, Barbaroux, and Vergniaud, while Madame Roland was a great influence in the party.

The Girondins originated in a schism in the Jacobin Club, first appearing in 1791. They were then the more moderate section of the Republican party, and in March, 1792, being the largest group in the assembly, Louis entrusted them with the control of affairs, and they declared war on Austria. Although both parties were in favour of destroying the monarchy, the struggle between the Girondins and the other Jacobins called the Mountain came to a head in the National Convention, in which the former were about 180 strong. Robespierre, Marat, and Danton were attacked by the Girondin orators, who, however, lost their support in the country, and fell from power by a *coup d'état* in June, 1793. Twenty-two of them were arrested, while others fled to the country and stirred up rebellion. After a trial, a travesty of justice, 21 of them were executed, Oct. 31, 1793, and others later. After the fall of Robespierre a few of them returned to the Convention. *See* French Revolution.

**Girtin, THOMAS** (1775-1802). English water-colour painter. Born in Southwark, Feb. 18, 1775, he received lessons from Edward Dayes (1763-1804), and frequently accompanied J. M. W. Turner to sketch on the Thames side. He was the founder of the modern school of painters in water colours.

He died of consumption, in the Strand, London, Nov. 9, 1802.

Turner said, "Had Tom Girtin lived I should have starved," and Ruskin allows that Turner "owed more to his teaching and companionship than to his own genius in the first years of his life." Girtin's broad, simple manner, his



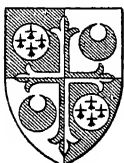
Thomas Girtin. Kirkstall Abbey, Yorks: one of this great water-colour painter's finest works, now in the Victoria and Albert Museum, S. Kensington



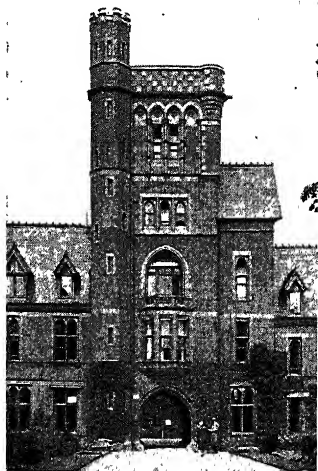
*J. Garton*  
After J. Opie

such as the White House, Chelsea, and Battersea Reach—are in private hands, but he is adequately represented at the British Museum. *Consult* Life, L. Binyon, 1900.

**Girton College.** College for the higher education of women, since 1948 part of the university of Cambridge. Founded in a house at Hitchin, Oct. 16, 1869, removed to Cambridge, Oct., 1873; obtained a royal charter, 1924; and a coat of arms, 1928. The founders included Miss Emily Davies and Mme. Bodichon. The college buildings, providing accommodation for resident fellows and students, are situated in the parish of Girton, on



Girton College arms



Girton College. Main entrance to the building which was begun in 1873 to the designs of Alfred Waterhouse, R.A.

the outskirts of Cambridge, and the college derives its name from Girton village. It was 1921 before students of Girton were allowed to use the titles of degrees they had won. *Consult* Emily Davies and Girton College, Barbara Stephen, 1927; Girton College, 1869-1932, Barbara Stephen, 1933.

**Girvan.** Police burgh and sea-side resort of Ayrshire, Scotland. It is at the mouth of the r. Girvan, 21 m. S.W. of Ayr, and has a harbour and a rly. station. There is golf, bowling, tennis, bathing and boating, loch and sea fishing for the holiday maker. Seaweed processing, fishing, the making of knitted and other woollen goods, boat building are the chief industries. Ailsa Craig, 10 m. to the W., is noted for sea fowl and for curling stones. Pop. (1951) 5,990.

**Gisborne.** Port of North Island, New Zealand, in Cook co. It stands on Poverty Bay, and has daily steamer communication with Napier. A fine town, the centre of a rich pastoral and agricultural district, it has freezing works, and exports wool and mutton. Here Captain Cook first landed in New Zealand, 1769. Pop. (1951) 19,777.

**Gish.** Name of two American actresses, the sisters Lillian (born Oct. 14, 1896, at Springfield, Ohio) and Dorothy (born March 11, 1898, at Massillon, Ohio). They both appeared in child parts on the stage, and were introduced to films in 1912 by Mary Pickford. They appeared with the Biograph Company in many of D. W. Griffith's pioneer films, acting together in *The Unseen Enemy*, *Hearts of the World*, *The Orphans of the Storm* (their best-known picture), and in *Romola*. Lillian also acted in Griffith's *The Birth of a Nation*, *Intolerance*, *Broken Blossoms*, *Way Down East*, and *The White*



Girvan, Ayrshire. The harbour and, in the distance, Ailsa Craig, or "Paddy's Milestone"

Sister; and Dorothy in *Tiptoes*, *London*, *Nell Gwynn*, and *Mme. Pompadour*. With the coming of talking films, both sisters returned to the stage.

**Gissing,** GEORGE ROBERT (1857-1903). British novelist. He was born at Wakefield, Nov. 22, 1857, and educated at Owen's College, Manchester. After spending some months in America he returned to Europe in 1877, and in 1878 published a Werther-like romance called *Workers in the Dawn*, the result of some months of study at Jena. In 1882 he became tutor to Frederic Harrison's sons, and subsequently brought out three novels, *The Unclassed*, 1884; *Demos*, 1886; and *Thyrza*, 1887; all concerned with the suffering of sensitive souls in a sordid environment.

More able, but equally joyless, novels were *The Nether World*, *New Grub Street*, *Born in Exile*, and *The Odd Women*. A scholar of



*George Gissing*



Gisborne. A general view of this port of North Island, New Zealand

parts and a man of sound critical judgement, Gissing's charming personal qualities and tastes are revealed in his monograph on Charles Dickens, 1898; By the Ionian Sea, 1901; The Private Papers of Henry Ryecroft, 1903, a semi-autobiographical volume. He died at St. Jean de Luz, Dec. 28, 1903. *Consult* G.G., F. A. Swinnerton, 1912; Letters, 1931.

**Giuliano**, SALVATORE (1923-50). Sicilian bandit. Born at Montelepre near Palermo in 1923, he was in 1943 a clerk in Palermo, and also a black market dealer in rationed foods. Caught carrying a sack of flour by carabinieri, he shot one of them dead, and escaped, an outlaw. Round him he gathered a band of other lawless men, among whom and in the countryside he posed as a champion of the liberation of Sicily. By 1950 he and his band had killed some 150 persons, including 102 policemen, and wounded many more. Put on trial at Viterbo in his absence, he was charged with 105 murders and more than 200 crimes of kidnapping, extortion, and blackmail.

In 1949 a new commander of the local carabinieri, Colonel Luca from Piedmont, was appointed. He replaced the Sicilians in his force by men from north Italy, then succeeded in persuading Giuliano's lesser followers to return to lawful life, captured 25 of the more important, and eventually tracked Giuliano and five companions to a house at Castelvetrano, some 30 m. S.W. of Montelepre, his usual centre of operations. There on July 3, 1950, Giuliano was found shot dead, it was generally believed by a companion in crime. *Consult* God Protect Me from My Friends, Gavin Maxwell, 1956.

**Giurgiu**. Town and river port of Rumania. It stands on the Danube, 38 m. S.S.W. of Bukarest, of which it is the port, and is linked with Rustchuk, Bulgaria, by a bridge across the Danube opened in 1954. Exports include timber, grain, petroleum, and salt. Formerly fortified, it was founded by Genoese colonists in early medieval times. It figured in the wars of the Russians and Turks. Pop. (est.) 31,000.

**Givenchy-lès-la-Bassée**. Village of France, in the dept. of Pas-de-Calais, 2 m. W. of La Bassée and 1 m. S.E. of Festubert. It was the scene of a considerable battle, Dec. 16-22, 1914, during the First Great War. To assist the French, then heavily engaged at Arras, the

Allied forces—Indian under Lt.-Gen. Sir James Willcocks and French under Gen. Foch—near Givenchy were ordered to create a diversion. They attacked, without success, and a German breakthrough seemed imminent when fresh troops under Haig were moved up, recovered part of Givenchy which had been lost, and restored the position at Festubert. There was more fierce fighting here in 1915, and in April, 1918, during the Germans' abortive drive to the Channel ports. Pop. (1954) 387.

**Givet**. Town of France, in the dept. of Ardennes. It stands on both sides of the Meuse, close to the



Givet, France. Looking down upon the Meuse from the ramparts of the old citadel

Belgian frontier. It has a number of small industries, including tanning, and is a river port; but its interest is mainly historical, as it was once a famous fortress. Of its fortifications only the citadel remains, the rest having been pulled down in 1892. This, founded by the emperor Charles V, and called Charlemont, stands on a rock. Givet has a town hall, several churches, and a stone bridge across the river. Givet was in the Spanish Netherlands until it became French about 1680. Pop. (1954) 6,656.

**Givors**. Town of France, in the dept. of Rhône, about 14 m. S. of Lyons, on the right bank of the Rhône at its confluence with the river Gier. The town's chief industries are metal working and glass-bottle manufactures, and there is considerable trade in silk and coal. The town is served by rly. Pop. (1954) 14,242.

**Gizah**, GHIZEH OR GIZA. Prov. of Lower Egypt. It contains the districts of Ayat, Es Saff, Embaba, and Ghizeh. Area 409 sq. m. Pop. (est.) 820,000.

**Gizeh**, GHIZEH, OR GIZA. Town of Egypt. It stands on the left bank of the Nile, opposite the

island of Roda, just above Cairo. Here is the palace of Gizeh, erected by the khedive Ismail. In the neighbourhood are the Pyramids. Pop. (est.) 67,000.

**Gizzard** (Lat. *gigēria*, poultry entrails). Term used in comparative anatomy for that portion of the alimentary canal which is specially designed for grinding food. Hence it is usually found in such animals as swallow food whole without mastication. The domestic fowl swallows particles of gravel to help the action of the muscular walls of its gizzard. Many crustaceans and insects possess gizzards.

**Gjinokaster**. Albanian form of the name of a town described under the Greek form Argyrokastron (*q.v.*).

#### **Glace Bay.**

Seaport and town of Cape Breton Island, Nova Scotia, Canada. It is situated on the E. coast, 10 m. E.N.E. of Sydney, with which it is connected by rly. Centre of a rich coalmining area, it lies also in a good farming district and has deep sea fisheries. Pop. (1956) 24,416.

**Glacial Acetic Acid**. Clear, colourless liquid or crystals, with a pungent odour, containing 99 p.c. of acetic acid. Aromatic acetic acid or aromatic vinegar contains about 74 p.c. of glacial acetic acid, together with odorants, and is used as a restorative and stimulant in fainting. The pure acid is sometimes applied to corns and warts.

**Glacial Period**. Name given to one of the great stages of development in the earth's history. It is the earlier of the two subdivisions of quaternary time, when the N. hemisphere was extensively covered by glaciers. *See* Ice Age.

**Glacier** (Fr.). Moving mass of ice. The edge of the permanent snow, the snow-line, varies in elevation from sea level in Antarctica to 2,500 ft. in Alaska, 8,500 ft. on the Alps, and 16,000 ft. on the S. slopes of the Himalayas.

As the snow above the permanent snow-line accumulates, the underlying portions, adjacent to the rock, slowly change into ice; when the mass of ice and snow is sufficiently thick it begins to move down the slopes. When the moving mass follows a definite path down a mountain valley, it is a glacier.

The physical changes which occur when ice moves under pressure have not been precisely determined. Owing to irregularities in the rock contour, deep cracks or crevasses occur in the upper glacier layers; they are sometimes hidden by a thin snow bridge, and are a source of ever-present danger to mountaineers. In its passage downwards, a glacier accumulates large quantities of rocks. Some of these sink into the mass of ice; others are moved to the margins of the glacier because the middle moves more rapidly than the sides. The débris of the edge is known as lateral moraines.

The snout of a glacier occurs where the temperature melts the ice as fast as it is brought down; in many cases the snout advances or retreats during different periods. From the snout a turbid, milky-looking torrent rushes down the valley, and when the snout retreats it leaves rock débris, which forms a terminal moraine.

#### Four Types of Glacier

Glaciers have been classified into four types: (1) valley glaciers; (2) piedmont glaciers; (3) ice caps; (4) continental glaciers. Valley glaciers occur in the Alps, where, e.g., the Aletsch is 10 m. long and 1 m. wide; in the Caucasus, Andes, Himalayas, and among the coast mts. of Alaska, where the Muir glacier is 35 m. long and from 6 to 10 m. wide. Alpine glaciers terminate on land, but the Alaskan glaciers reach the sea, and portions break off and float away as icebergs. The rate of movement of some valley glaciers has been measured; the Mer de Glace in France moved during the warm season from 1 ft. to 1½ ft. a day along the margin, and about 2 ft. daily in the middle; the Muir glacier moved 7 ft. daily in the middle. The rate varies with the season, and from year to year.

Piedmont glaciers occur when a valley glacier pushes out on to a nearly level area at the base of the mountains. The Malaspina piedmont glacier, fed by numerous valley glaciers, is 70 m. by 25 m.

Ice caps occur in Iceland; the largest is at Vatna Jökull. In this case the ice moves very little, owing to the level character of the rock contours. Extensive ice caps are called continental glaciers, or ice sheets. Greenland and Antarctica are both covered with ice formations of this type. The great depth of the ice sheet causes outward movement, and in Antarctica the great ice barrier, an ice cliff margin to the Ross Sea, is 500



Glacier. The upper névé from which the Grindelwald, Switzerland, glacier is fed, and an ice fall due to the glacier being broken up as it pours down the slopes. In the background is the Schreckhorn.

m. in length, and rises sheer from the water to heights from 30 ft. to nearly 300 ft. The Greenland continental glacier is steadily pushing seawards, the tongues of ice project into the water, in some cases with a front 60 m. in width. These tongues move 5 to 75 ft. per day, and are constantly losing great blocks, which feed the never-ending stream of bergs in the N. Atlantic.

The various signs left by retreating glaciers—terminal moraines, layers of glacier silt (till or boulder clay), isolated rock fragments, rounded rocks (*roches moutonnées*), striations upon rock faces, etc.—are so common in Britain N. of the Thames, and in Europe N. of Bohemia, that it is concluded that most of Europe has been covered at least once by a continental glacier of Antarctic magnitude. See Finsteraarhorn; Geology; Ice Age; consult also *Glaciers of the Alps*, J. Tyndall, 1896; *Characteristics of Existing Glaciers*, W. H. Hobbs, 1911; *Natural History of Ice and Snow*, A. E. H. Tutton, 1927; *Climatic Accidents in Landscape Making*, C. A. Cotton, 1942.

**Glacis** (Fr. *glace*, ice). Artificial slope in front of a fortification. In permanent fortresses the glacis were frequently built at a considerable gradient, so that the attackers had to proceed up them slowly under the defenders' fire. The glacis was introduced into fortifications in the 16th century owing to the increasing power of artillery. It is mentioned in *The British Grenadiers*, the words of which date from about 1690.

**Glabdach.** Name of two German towns. The more important, formerly München-Glabdach, was

united with Rheydt and Odenkirchen in 1933 as Gladbach-Rheydt. It is 15 m. W. of Düsseldorf. Developed around a Benedictine abbey whose church was built in 972, and stood until the Second Great War, Gladbach became in the 18th–19th centuries a centre of the German textile industry, with about 400 separate plants. There were also iron, metal, machinery, electrical, and printing works, and clothing manufactures. Gladbach was the seat of Germany's main R.C. charity and educational organizations, and had a baroque town hall (1663), museum, theatre, and concert hall, but suffered heavy damage in the Second Great War, before which its pop. was 127,115.

Bergisch-Gladbach, 8 m. N.E. of Cologne, is a health resort, with sanatoria, schools, and special industries concerned with paper, ceramics, gypsum, iron, machinery, bicycles, wire netting, leather goods. Pop. 20,121.

**Gladiator** (Lat. *gladius*, sword).

Term applied among the ancient Romans to a professional fighter who fought with others or with wild beasts. Such combats, a common feature of funeral ceremonies among the Etruscans, were doubtless a reminiscence of human sacrifice. The custom was introduced into Rome in 264 B.C., and gladiatorial combats in amphitheatres became a recognized amusement, attaining the zenith of popularity under the Empire. Gladiators were recruited from prisoners of war, criminals, and volunteers, the latter chiefly young men in financial difficulties. Schools existed for training them, and the wealthy man of fashion took the same pride in maintaining

a school that his modern counterpart takes in a racing stable.

There were several different classes of gladiators, such as the *bestiarius*, who fought with wild beasts, and the *retaliarius*, who was armed with a trident and a net (*rete*) in the meshes of which he endeavoured to entangle his opponent. Other gladiators were the *mirillo*, whose helmet was adorned with the figure of a fish, and was usually opposed by the *Thrac*, wearing a Thracian equipment, a round shield and a short

m.p.h. and exceptional manoeuvrability. The wing span was only 32 ft. 3 ins.

The Gladiator twice made history against overwhelming odds. In the short-lived but desperate defence of Norway in April, 1940, a squadron was flown off the carrier Furious and established a base on a frozen lake near Aandsnes. (See North-West Europe, Campaign in.) When Italy attacked Malta in June, the only available fighters were three Sea Gladiators, still crated. These were made serviceable, and as Faith, Hope, and Charity staved off air attacks until the arrival of Hurricanes.

**Gladiolus** (Lat., little sword). Beautiful flowering bulbs of the family Iridaceae. Most are natives of S. Africa, though some Turkish species were introduced in 1596. They flower from June to Oct., bearing a number of blossoms on stiff, almost upright, spikes. The corms should be planted in spring-time, about 4 ins. deep in ordinary rich soil, with a dash of silver sand at the base of each bulb.

It is advisable to dig them up after flowering, in late autumn, and keep them in a cool, dry place until the following spring. For show purposes they may be forced by potting up in Nov., in a temperature averaging 60°. They are propagated from seeds sown in pans in Feb., or by bulblets separated from the parent corm and planted out of doors in early spring.

**Gladkov, FEDOR VASILIEVICH** (b. 1883). Russian novelist. A schoolteacher in Siberia, 1902-05, he was exiled to Lena on account of his Communist activities, 1906-10. From 1911 he taught at Novorossiisk and in the Kuban, and after the Revolution of 1917 took an active part in the civil war. As a leading novelist, he became a member of the union of Soviet writers, and was awarded the Orders of Lenin and of the Red Banner in 1943. His novels include *Exile*, 1908; *Old Secret*, 1923; *Towards the Light*; *Cement Power*.

**Gladstone, Town of Queensland, Australia.** It stands on the fine natural harbour of Port Curtis, 354 m. N.N.W. of Brisbane. It is the outlet of a number of mining areas producing gold, silver, and manganese, and is in a rich pastoral district. Pop. 5,200.

**Gladstone, HERBERT JOHN GLADSTONE, VISCOUNT** (1854-1930). British politician. Born Jan. 7, 1854, youngest son of W. E. Gladstone, he was educated at Eton and University College, Oxford. Having been a history

lecturer at Keble College, in 1880 he was returned to parliament for West Leeds, and became private

secretary to the premier. From 1881 he was a lord of the treasury, and in 1886 financial secretary to the War office.

During 1892-94 he was under-secretary for home affairs, and in 1894-95 first commissioner of works. In 1899, during the Liberal split, Gladstone undertook the thankless office of chief whip, and was rewarded in 1905 by being made home secretary. In 1909 he was chosen governor-general of S. Africa, and made a viscount. He remained there until the outbreak of the First Great War, during which he was an active worker on behalf of the Belgian refugees.

A defence of his father's policy, *After Thirty Years*, was written in 1928. Following certain defamatory statements about his father made in a book, Gladstone then figured as defendant in a memorable libel action forced by him upon the author. The finding in Gladstone's favour demonstrated for the first time that the dead could not be vilified with impunity. He died childless, March 6, 1930.

**Gladstone, WILLIAM EWART** (1809-98). British statesman. Born at 62, Rodney St., Liverpool, Dec. 29, 1809, he was the youngest son of Sir John Gladstone, Bart., M.P. (1764-1851). The family was a Lanarkshire one, but Sir John had made a fortune in Liverpool. William spent his early years mainly at Seaforth, and in 1821 went to Eton, where he remained until 1827. In 1828 he entered Christ Church, Oxford. He gained a double first class degree.

He first turned his attention to the Church. But his father had resolved to make him a politician, and a Tory seat was easily found for him at Newark. In Jan., 1833, he took his seat in the first reformed parliament. In 1834 he was appointed by Peel a junior lord of the treasury, and in 1835 under-secretary for the Colonies, but in a few weeks his party was out of office.

In 1841, when the Tories returned to power, Gladstone was made vice-president of the board of trade. He became acting president in 1843, entering a cabinet for the first time. In 1845 he left



*W. Gladstone*  
Russell



**Gladiolus.** Flowers and leaves of the garden variety

sword; the *andabata*, who fought on horseback and wore a helmet which entirely covered the face; the *laquearius*, who carried a lasso to catch his adversary. A gladiatorial display in the amphitheatre began with a procession of gladiators. As the procession passed the Emperor's seat, the gladiators cried *Ave Caesar, morituri te saluant* (Hail, Caesar, those about to die salute thee). When one combatant was overcome but not killed by another, the spectators, by turning their thumbs up (or against the breast) or down, determined the fate of the beaten gladiator. The exact significance of the action is disputed. Lytton's *Last Days of Pompeii* and Henryk Sienkiewicz's *Quo Vadis?* contain striking descriptions of gladiatorial combats. See *Amphitheatre*.

**Gladiator.** Type of fighter aircraft produced by the Gloster Aircraft Co., Ltd. (Hawker Siddeley group). Last of the biplanes, the Gladiator was armed with four machine-guns, and, powered by a 850 h.p. Bristol Mercury engine, had a maximum speed of 250

office because he disliked the additional public grant to the R.C. college at Maynooth, but at the end of the year he returned to become secretary for war and the colonies. In July, 1846, the ministry resigned. In 1847 Gladstone was returned for the university of Oxford; but his political position was not very clear, as he was not completely committed to the Peelites, but had broken with the Toryism of his youth. In 1851 he wrote from Italy his letters denouncing the Bourbon king of Naples.

#### At the Exchequer

On Dec. 2, 1852, Gladstone joined the ministry of Lord Aberdeen as chancellor of the exchequer. Changes in the direction of simplicity proposed in his first budget marked him out as a great financier. Then came the Crimean War, the resignation of Aberdeen, and in Feb., 1855, that of Gladstone. While in opposition he acted as high commissioner for the Ionian Islands. In 1859 the Conservative ministry was defeated. Gladstone returned to the exchequer for seven years. He abolished the paper duty, and reduced income tax to fourpence in the £.

In 1865 he succeeded Palmerston as leader of the house of commons, Russell becoming prime minister, and he was in charge of the rejected reform bill of 1866. The Russell ministry then resigned, and in 1867 Gladstone led the Liberals. About the same time Disraeli succeeded Derby, and the two great rivals became the chief figures on the political stage. The general election of 1868 was fought largely on the issue, pushed to the front by Gladstone, of the disestablishment of the Irish Church. The Liberals were returned to power, Gladstone becoming prime minister for six years. This was a notable reforming administration, but its leader's relations with the Queen lacked cordiality.

Defeated in 1874, Gladstone decided to retire from political life, and was succeeded as Liberal leader by Lord Hartington, but he kept his seat in the house of commons, and events, or his own undoubted love of power, soon called him again to the front. The Turkish possessions in the Balkans became the scene of savage fighting, and with the fervour of a crusader Gladstone carried on a campaign against Turkish misrule and cruelty. He did not actually resume the party leadership, but when the general election of 1880 came he was the protagonist of the opposition to the Conservative policy, and his speeches in the



*W. E. Gladstone*

From a photograph by London Stereoscopic Co., taken in 1888

famous Midlothian campaign were mainly responsible for the Liberal victory. He then became M.P. for Midlothian, retaining that seat until his final retirement in 1885.

Gladstone, now at the height of his influence, took office a second time, being chancellor of the exchequer as well as first lord of the treasury until 1882. There were difficulties in Ireland and in Egypt, which were not helped by the constant dissensions in the cabinet.

The Phoenix Park murders, and the death of Gordon, weakened the position of the ministry, but it held on until 1885. Then came a general election, at which neither party gained a clear majority, and Gladstone's sudden declaration in favour of home rule for Ireland.

In Feb., 1886, the Conservative ministry was beaten and Gladstone took office for the

third time as premier, but the defection of some of his party led to the defeat of his Home Rule bill and to another election, in which he was defeated. The election of 1892 returned him to power by a small majority. The house of lords rejected Gladstone's second Home Rule bill, but it was the size of the navy estimates that led to his resignation in March, 1894. He retained his seat until 1895. He appeared in public in Sept., 1896, to denounce the Armenian massacres. He died at Hawarden, May 19, 1898, and was buried in Westminster Abbey.

In 1839 Gladstone married Catherine, sister and heiress of Sir Stephen Glynne, 9th baronet. Through this marriage the castle and estates of Hawarden passed into the Gladstone family.

After a life spent either in strenuous labour or in recreations scarcely less laborious, including the felling of trees, Gladstone could walk to the summit of Snowdon when he had turned eighty; and, when blindness and deafness had disabled him, the stethoscope found nothing amiss in heart or lungs.

#### An Estimate

By common consent Gladstone, popularly spoken of in his own lifetime as the G.O.M., or Grand Old Man, ranks as one of the great orators of the 19th century, and perhaps its greatest parliamentarian. A clear and beautiful voice, a generous flow of language, and above all a burning belief in the cause he was at the moment advocating, account for his power to sway the multitude. He was also great as a finance minister, where his lucidity of expression, grasp of detail, and capacity for work found full play. As premier he was hardly so successful. His vehement nature was not fitted for calm and calculated action, and his imperiousness made it difficult for others to work with him.

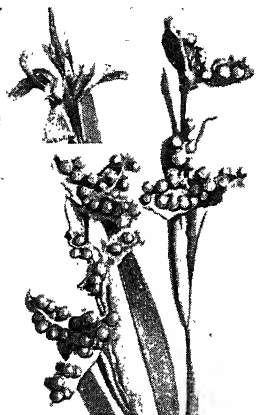
**Bibliography.** Lives, G. W. E. Russell, 1891; H. W. Lucy, 1895; J. Morley, 1903-05; Some Hawarden Letters, Mary Drew, 1917; After Thirty Years, Viscount Gladstone, 1928; The Queen and Mr. Gladstone, P. Guedella, 1933; Gladstone to his Wife, ed. A. T. Bassett, 1936; Mrs. Gladstone: The Portrait of a Marriage, G. Battiscombe, 1956.

**Gladwyn** (*Iris foetidissima*), FOETID IRIS, OR ROAST-BEEF PLANT. Perennial herb of the family Iridaceae. It is a native of W. Europe. The rootstock is thick and creeping, the leaves 2 ft. long, sword-shaped, erect, and dark green, the flowers dull blue-purple,



Hawarden Castle, Flintshire, for 60 years the residence of W. E. Gladstone





Gladwyn or Gladden. Fruit and inset, flower of *Iris foetidissima*

with darker veins, about 3 ins. across. The club-shaped capsule splits into three spreading sections, late in autumn, disclosing the bright orange, round seeds, which make the plant more conspicuous than when in flower.

**Glaisher, JAMES** (1809-1903). British meteorologist. Born in London, April 7, 1809, he was employed on the Irish ordnance survey, and in 1833 received an appointment at Cambridge observatory. For over 30 years from 1836 he was head of the meteorological department at Greenwich. He founded the (Royal) Meteorological

Society in 1850, and 16 years later helped to found the (Royal) Aeronautical Society. In a balloon ascent, Sept. 5, 1862, Glaisher and H. T. Coxwell reached a height of 37,000



James Glaisher, British aeronaut  
Elliott & Fry

ft. Glaisher wrote *Meteorology of England*, 1860; *Travels in the Air*, 1870; *Crystals of Snow*, 1872. Elected F.R.S., he died Feb. 7, 1903.

**Glamis.** Village and parish of Angus co., Scotland. It stands on Glamis Burn, six miles west-south-west of the town of Forfar. In the village there is a sculptured stone, said to be a memorial of Malcolm II. Near the village is Glamis Castle, a seat of the earl of Strathmore. The present building, dating mainly from the 17th century, is in the Scottish baronial style, with parts of a much older building. Glamis is steeped in history and legend. Here Macbeth is said to have lived and Malcolm II to have been slain.

Elizabeth, consort of George VI, was brought up, and their daughter Margaret was born, at the castle. Pop. (1951) 879. *Pron.* Glahms.

**Glamorganshire.** County of S. Wales. It lies along the Bristol Channel, its other boundaries being the counties of Carmarthen, Brecknock, and Monmouth. Owing to the development of the rich coalfields, it has become one of the great industrial centres of the country and contains more than half the pop. of Wales. The chief mining area is in the valleys that run down to the sea around Cardiff, while there is another industrial area around Swansea. Between Rhymney and Neath is the agricultural region known as the vale of Glamorgan. The Gower peninsula in the W. is in some respects

vale of Neath, with its series of waterfalls. Cardiff, Swansea, and Merthyr Tydfil are the largest towns. Coalmining has developed enormously since about 1850; older industries are the tinplating and smelting which made Swansea and Merthyr Tydfil.

Agriculture is carried on especially in the vale of Glamorgan, where the soil is rich. The county, known to the Welsh as Morganwg, was conquered by the Normans in the 11th and 12th centuries, and several castles were built here as defences against the Welsh from the N. Monasteries were founded at Neath, Margam,



Glamorganshire arms



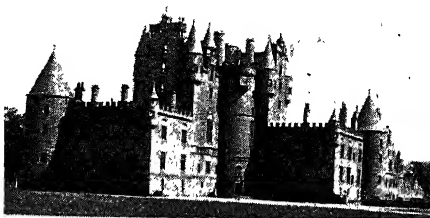
Glamorgan. Map of the county in which are situated the principal coalfields of South Wales

quite apart from the rest of the co.; on it are Worms Head and the Mumbles Head. Swansea Bay and Burry Inlet are the chief openings.

The chief rivers are the Taff, Tawe, Neath, Cynon, Ogwr, Rhonda, Rhymney, all short and flowing S. In the N. of the co. are mts., a continuation of those in Brecknockshire, the highest point being nearly 2,000 ft. high. There is some beautiful scenery, especially in the

and elsewhere, and Glamorganshire, smaller than it is today—for Gower was outside it—was a copalatin. Cowbridge, Kenfig, Llantrisant, Neath, and Aberavon became chartered towns. The earls of Gloucester and then other baronial families were lords of Glamorgan, and in the time of Edward VI the title was given to William Herbert, who afterwards became earl of Pembroke.

Ruined castles include Caerphilly, Oystermouth, Llanblethian, Penarth, and Swansea. Cardiff, St. Donats, Dunraven, and Penrice have been restored, and are now inhabited. Ewenny has a fine church and ruins of an abbey. The co. is in the dioceses of Llandaff and of Swansea and Brecon. The county comprises seven county and nine borough



Glamis. Glamis Castle, Angus seat of the earl of Strathmore, and birthplace of Margaret Rose, younger daughter of George VI and his consort

constituencies. Area, 813 sq. m. The pop. in 1951 was 1,201,989.

**Gland** (Lat. *glans*, acorn). Term describing (1) masses of tissue connected with the lymphatic system, such as are found in the neck, which prevent the spread of infection; (2) organs of the body which pour out by means of a duct (e.g. the pancreas), or directly into the blood stream, substances necessary for maintaining bodily health. (See Endocrinology.)

Ductless glands pour their secretion direct into the blood stream without using any conduit. Among them are the pituitary, thyroid, adrenals, testes, and ovaries. Some important glands have a dual performance: thus, the liver secretes bile, but makes other glandular contributions to the organism with no definite conduction; the pancreas, while pouring out a digestive juice through a duct, contributes to the blood stream a secretion from its substance insulin, which travels by no discernible route, but enables the muscles to burn and use glucose. Much research has been done on the interaction of the ductless glands.

**Glanders.** Infectious disease occurring principally in the horse and occasionally transmitted to man. Affecting the nose in the form of nodules, it is known as glanders; invading the subcutaneous tissues, it is known as farcy. The organism is the glanders bacillus, which gains entry through any abrasion of the skin, or of the nasal mucous membrane. The disease is characterised by profuse discharge from the nose, fever, general constitutional disturbance, and nodules, vague in distribution, under the skin.

The disease is often difficult to diagnose. The answer lies essentially with bacteriology. Any localised condition demands drastic treatment by knife and drug, while the general condition demands treatment for any generalised septicaemia.

**Glanvill, RANULF DE** (d. 1190). English lawyer. Born at Stratford, Suffolk, he entered the service of Henry II. In 1163 he was sheriff of Yorkshire, and he was afterwards sheriff of Lancashire. In 1176 he was made a judge and from 1180 to 1189 was chief justiciar of England. Richard I deprived him of his office and put him in prison, but he is said to have been on crusade at Acre when he died. Glanvill is known by his Treatise concerning the laws and customs of the English kingdom; this is a unique and invaluable account of

the subject, first published in 1554. He was also Henry's chief helper in the judicial reforms carried out in this reign.

**Glärnisch.** Mt. range of Switzerland. In the canton of Glarus, it trends S.W. from the town of Glarus, and has several imposing peaks. The Vorder-Glärnisch, 7,648 ft. in height, is difficult and laborious of ascent. Other peaks are the Ruchen-Glärnisch (9,557 ft.) and the Bächistock (9,582 ft.).

**Glarus.** Canton of E. Switzerland. It is bounded on the N. and E. by the Wallen See and St. Gall, S. by Grisons, W. by Uri and Schwyz. Area, 264 sq. m. It slopes N. from Mt. Tödi, on which is the source of the Linth. There are several lakes, mineral springs, and fine waterfalls, besides the bold rocky group of the Glärnisch.

An Alpine canton, it has a climate somewhat severe, and only about one-fifth of the surface is arable. The inhabitants are mostly German-speaking, and mainly Protestants, while the chief industries are connected with textiles, cattle raising, and slate quarrying. A speciality is the curious green cheese known as Schabzieger.

Glarus is the chief town. The canton joined the Swiss Confederation in 1352. Pop. 34,771.

**Glarus** (Romansch, *Claruna*; Fr. *Glaris*). Town of Switzerland, capital of the canton of Glarus. It stands on the river Linth, overlooked by the imposing Vorder-Glärnisch, 43 m. by rly. S.E. of Zürich. A serious conflagration in 1861 destroyed nearly all the town, which was founded at the end of the 5th century by S. Fridolin, an Irish monk, and was settled by Germanic tribes. Zwingli (q.v.) was parish priest here for 10 years. The chief occupation is the manufacture of textiles. Pop. 5,269.

**Glas, JOHN** (1695-1773). Scottish divine. He was born at Auchtermuchty, Sept. 21, 1695, and became minister of Tealing, near Dundee, in 1719. Here he founded a sect which became known as the Glassites (q.v.). For this he was deposed in 1730, but this decree was revoked in 1739 and Glas preached in Dundee until his death, Nov. 2, 1773, though not holding office. His son-in-law, Robert Sandeman (q.v.), carried his ideas further, giving his name to the sect of the Sandemanians.

## GLASGOW: SCOTLAND'S LARGEST CITY

Sir Patrick Dollan, Lord Provost of Glasgow, 1938-41

*A noted citizen and lover of the city of Glasgow here tells the story of its rise and explains its importance, not alone to Scotland but to Great Britain and the world. See also Clyde: Clydebank*

Glasgow is world-renowned. The then bishop of Glasgow obtained the burgh charter from James II, in 1175; but the rise of the city to eminence has been rapid, and has happened since the Act of Union, 1707. At that time the pop. was only 12,000.



Glasgow arms

It was 202,426 by 1831, when only 33 of the citizens had the right to vote. The Reform Act of 1832, making Glasgow a parl. and mun. burgh, accelerated the growth of the Lanarkshire capital of Clydeside. At the 1951 census the city had 1,089,555 inhabitants; and under the 1948 redistribution was divided into 15 burgh constituencies. Few cities have increased in size so quickly. It has three important main line railway stations, Central, St. Enoch, and Queen Street, and is the natural centre for rail, road, and steamship communications with the W. Highlands and Islands. Before the Second Great War there were direct steamer services to the

U.S.A., Canada, India, and New Zealand. The city's municipal transport system—electric tramcar, trolley-bus, and motor bus services, and the 6½ m. subway rly.—carried over 660 million passengers more than 60 million miles in 1956, and is claimed to be the best and cheapest in the world. Apart from London, Glasgow is the only city in the U.K. with an electric underground rly.

The development of industry made Glasgow a melting pot for the Highlands and Islands, and incomers from the N.E. coast, from the S., and from Ireland. Social and industrial conditions became deplorable. Housing was lamentable. Disease was rampant and mortality excessive. All that has been gradually changed. Infant mortality had fallen by 1946 to 67 per 1,000, the lowest in Glasgow's history; average mortality to 13·8 per 1,000. Some districts are as healthy as New Zealand, Denmark, or any other specially favoured country. Before the national health service came into force, the city spent over £2,000,000 every year on health, and still



Glasgow. Map of the district showing the towns which have grown up around this important centre of commerce and manufacture

regards this as a sound investment. The saving in life compared with 100 years ago has been estimated at as much as 25,000 lives per annum.

Glasgow owns municipal properties to the value of £154,577,415. It is the richest of all local authorities, except London, in real estate. The town council's building plan after the Second Great War envisaged an expenditure of over £100,000,000 on housing in 15 years, in addition to huge sums for schools, hospitals, bridges, and other public works.

#### Thrift in the City

Some 675,000 of Glasgow's citizens have over £100,000,000 in the Savings Bank, the most powerful thrift organization in the world. It is estimated that the aggregate savings of working and middle-class folk in savings banks, co-operative societies, friendly societies, and allied associations is in the region of £200,000,000. This is exclusive of the possessions and investments of the so-called industrial, property-owning, and capitalist classes. Everybody in Glasgow is, in effect, a property owner and capitalist of sorts.

Glasgow is the only city in the British Commonwealth with an award for citizenship, the S. Mungo prize, bestowed triennially on the citizen who, in the opinion of the trustees, has done most for the good of the city by making it more beautiful, healthier, or more honoured. Six awards have been made. The prize was endowed by a shopkeeper who, remaining anonymous,

wished to use his surplus wealth for the advantage of the city in which he had worked and lived over 70 years.

#### Educational Facilities

The university charter was granted by Pope Nicholas V in 1450-51, and the university now has accommodation for 5,000 students in the various faculties. There are also technical, domestic and commercial colleges, the Anderson medical college, the school of art, and other specialised cultural institutions. Glasgow men helped to start universities in London, Montreal, and Princeton, U.S.A., while Professor John Anderson was the pioneer of the mechanics' institutes and polytechnics since established in all parts of Great Britain. There is no racial or religious bar to educational progress on Clydeside. The corporation spends over £4,000,000 a year on education, and almost £30,000,000 yearly on all the civic services. But the cost to the householder is not prohibitive. A man and wife with three children living in a house rented at £30 a year pay 8s. 2d. a week in rates, or 1s. 2d. a day. This works out at 3d. per head, which must be among the lowest charges for comparable public services.

Glasgow's public art galleries and museums with their contents, and the books in the libraries (not included in the valuation of £154,577,415 for municipal properties) are easily worth £3,500,000. They are owned by the municipality, and surpass in value the

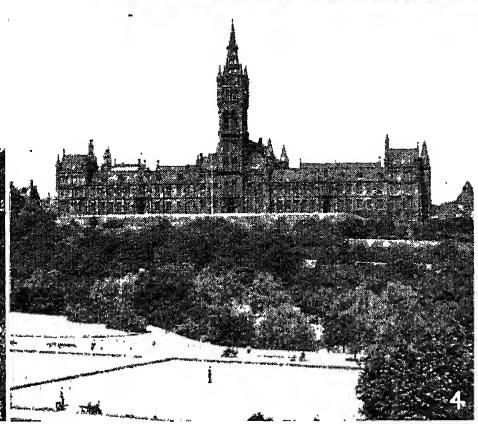
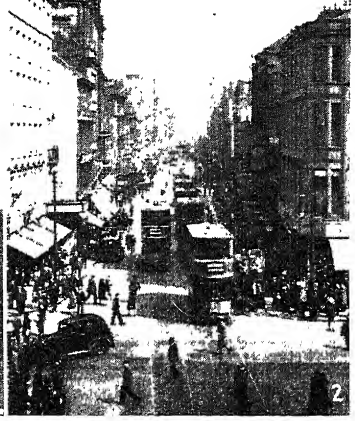
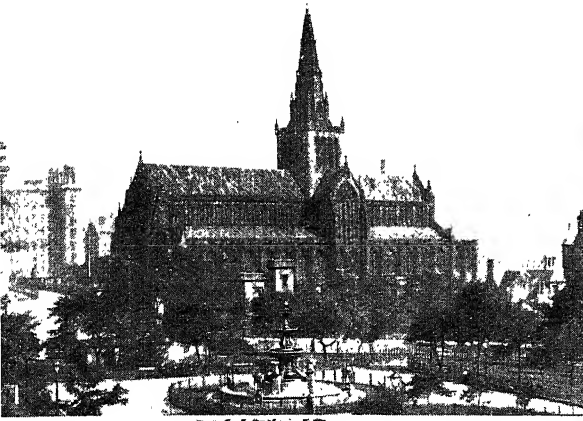
artistic and cultural possessions of any other city in the British Commonwealth.

Religious toleration has been a characteristic of Glasgow since in 543 S. Kentigern (Mungo) raised the standard of Christianity and founded Glasgow on the banks of the Molindinar river, a tributary of the Clyde. A cathedral dedicated in 1136 was burned down c. 1189. The first section of the present building was dedicated in 1197. It and S. Magnus alone of the pre-Reformation cathedrals on the Scottish mainland escaped destruction during the Reformation disorders of the 16th century. It was saved by the merchants and tradesmen when it was threatened by a mob. It is the chief centre of the Church of Scotland, and is still used for regular services, and for special services connected with the city and the nation.

The churches of Glasgow are now better attended than they were in the beginning of the 19th century. All denominations seem to have achieved harmony and understanding, and cooperate on the education committee and in many other directions. The habits of the people have improved; in 1928 there were 1,519 premises licensed for the sale of alcoholic liquors, and 8,373 prosecutions for drunkenness; in 1946 the comparative figures were 1,353 and 2,340.

#### An Industrial Community

But it is as an industrial community that Glasgow is best known. Its citizens like to call it the industrial capital of Great Britain. For more than a century it has been celebrated for its heavy industries—iron, steel, shipbuilding, engineering, and the making of locomotives, boilers, cranes, bridges, and machinery. Ships built there include the *Empress of Britain* and *H.M.S. Hood*, both sunk during the Second Great War, the *Queen Mary* and the *Queen Elizabeth*, *H.M.S.S. Duke of York*, *Vanguard*, and *Implacable*. Scottish shipyards in 1946 had an aggregate output of 379,515 tons of mercantile shipping, and carried out repair and conversion work on merchant ships of a gross tonnage of 4,623,454 tons. The Clyde navigation trust, which has spent over £12,000,000 on the docks and waterways in proof of its confidence in the future of shipbuilding and shipping has planned a long-term programme of extensions and improvements to cost over £7,000,000; and shipbuilders have taken leases of new lands in



1. Glasgow cathedral, dating from 12th to 15th century.  
2. Argyle Street, chief shopping thoroughfare. 3. City art gallery, seen from Kelvingrove Park. 4. Glasgow University buildings, designed by Gilbert Scott, 1858.

5. Broomielaw Bridge over the Clyde, opened 1899.  
6. Prince's Dock. 7. George Square and the municipal buildings, showing the 80-ft. column of the Scott monument, and equestrian statue of Queen Victoria

**GLASGOW: VIEWS OF SCOTLAND'S GREAT INDUSTRIAL METROPOLIS**

perpetuity or for 60 years. In 1947 the shipbuilders had contracts to keep them all busy for four years.

At least 40 p.c. of all the shipping built in Great Britain in a normal year is launched on the Clyde; and Clyde-built marine engines, boilers, electrical equipment, and locomotives are sent to all parts of the world. Glasgow locomen build locomotives for India and for Africa; Babcock and Wilcox boilers and electric power plant are designed for nearly every country in the world.

#### Lord Kelvin's Record

The city's engineers are also skilled in the lighter industries. Several firms are famous for the optical and other instruments they make for the Royal navy and the merchant navy, the R.A.F., and the army. This is what might be expected in a city where Lord Kelvin registered 50 patents for telephonic, cable, and electric communications. His influence and name are still respected in two of the largest companies which fulfil orders for all kinds of scientific instruments and apparatus from every country on the globe.

The Singer manufacturing company started to manufacture sewing machines in Bridgeton in the E. end of Glasgow, and later built larger factories in Clydebank outwith the city boundary. Here 90 p.c. of all British sewing

machines are made for the home and export markets. Glasgow also makes carpets of all kinds, the E. end having the largest carpet factory in Great Britain. Carpets for the coronation and other national ceremonies have been made here. Scores of new factories for lighter industries employ men and women formerly considered heavy handed. These new industries include the making of radio receiving sets, vacuum cleaners, clocks, typewriters, refrigerators, restaurant equipment, ventilators for houses, shops, and factories, electric lamps, cycles, chemicals, motor vehicles, photographic equipment, atomic research and other scientific apparatus, dry batteries, motor tires, clothing, laundry plant, books and paper, tobacco, and cigarettes. There is hardly anything wanted at home or abroad that Glasgow is not prepared to make.

#### Manufacture for Export

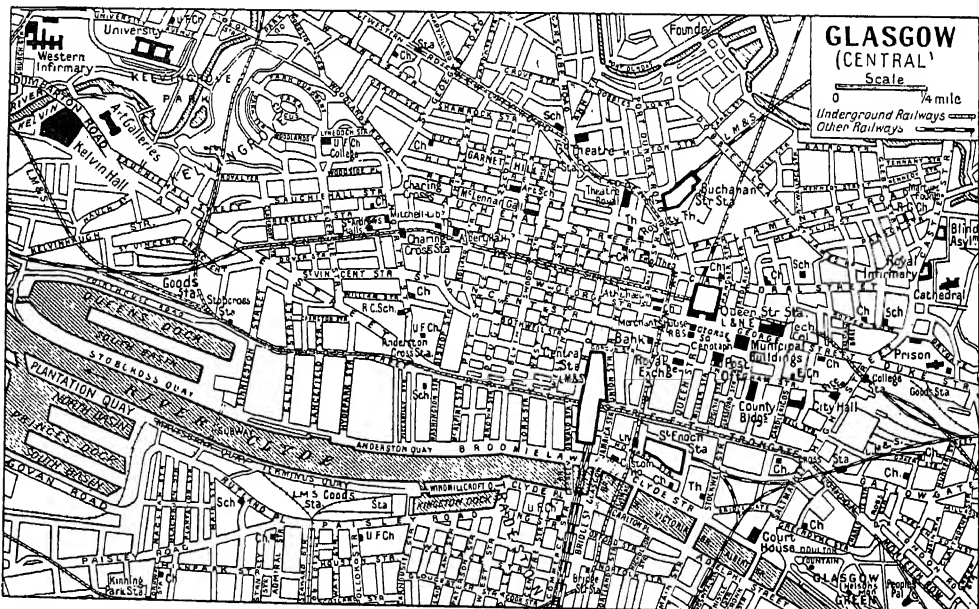
The workers of the city also excel in the making of coalmining machinery, pumps, and valves, while its textile machines are of such high quality that some producers can sell as easily in the U.S.A. as in Great Britain. The city also produces fully 50 p.c. of all the manufactured bread, biscuits, and cakes consumed in Scotland, and in normal times exports special food products to the Dominions, the colonies, and the U.S.A. It has

the oldest brewery in Scotland, which before the Second Great War exported more beer than any other brewery in Great Britain. Huge quantities of whisky are blended and bonded in Glasgow, which is also the chief centre for shipping supplies to the U.S.A. and other overseas buyers.

#### Iron and Steel Plants

Immediately after the Second Great War, plans for Glasgow included the modernisation of its iron and steel plants, at an estimated cost of £29,000,000; the building by the government of a £20,000,000 integrated plant for iron and steel at Bishopton; the construction of a giant graving dock to take the biggest ships afloat at a probable cost of over £20,000,000; the driving of a vehicular and pedestrian tunnel under the Clyde between Scotstoun and Linthouse, estimated to take 10 years to complete and to cost £15,000,000 to £20,000,000.

Glasgow has been interested in flying since Percy Pilcher experimented with gliders there and at Dumbarton in the 1890s. A Scottish aviation company was started at Barrhead near Glasgow in 1911 with a capital of £10,000, but the aerodrome and the first two machines were burnt out the following year. During the First Great War over 2,200 engines were built by Glasgow firms, one of which, William Beardmore & Co., also



Glasgow. Plan of the central portion of the city, showing the principal buildings, railway stations and docks, as well as Kelvingrove Park and the inner suburbs

designed and constructed R 34, the airship which made the first double Atlantic voyage in 1919. The industry, however, lapsed until the Rolls Royce co., operating a government factory at Hillington, started production in 1940. Between 1940 and 1945 almost 24,000 new engines were built, and 30,000 others converted, at Hillington.

Glasgow airport, which is at Renfrew,  $6\frac{1}{2}$  m. from Glasgow, was the first civil airport in Scotland. In 1945 there were ten routes based on it; in that year they flew 29,573 passengers a total of 2,321,607 miles. During the Second Great War thousands of aircraft were assembled and flown or transported from there to all war zones. Over 1,500 mechanics were employed at Renfrew by the American Lockheed Co. repairing and reconditioning U.S. bombers; more than 40,000 men, women, and youths were employed on air work in Glasgow.

#### Sport and Recreation

Glasgow has six first league football grounds capable of accommodating a total of over 400,000 spectators. Hampden, the largest ground in the world, has held 150,000 persons, but the number is now restricted to 135,000; Ibrox, the next largest, has held 117,000, Celtic Park can hold 80,000. There are also about 200 other pitches for junior and juvenile footballers.

There are over 120 cinemas and 50 dance halls. Jazz has its devotees, but the classical concerts of the Scottish orchestra and the Glasgow choral union also draw many listeners.

Theatres and music halls have declined in number, though they attract big audiences. The Princess's theatre, once famous for pantomime, now specialises, as the Citizen's theatre, in modern drama with a preference for the Scottish brand. Unity theatre caters for those who want left-wing plays. But pantomime in winter and variety is summer are the most popular stage performances for Glaswegians. Pantomimes run to full houses for 20 weeks, summer variety shows often continue for a four months' season.

The original university buildings, situated near High Street, have been supplanted by the modern buildings at Gilmorehill, designed by Sir Gilbert Scott and completed in 1870. These overlook Kelvingrove park, in which the Western infirmary, the Anderson college, and the art gallery are situated. The university includes

the Hunterian museum and the Bute hall, two of the cultural "show places" in the city. The art gallery, damaged during the 1941 air raids, was opened in 1961 as part of an international exhibition, and cost £250,000. Kelvin hall is, after Olympia, London, the largest exhibition centre in Great Britain.

Historic buildings include, besides the cathedral, Provand's lordship, said to be the oldest house in the city. Built and occupied by Bishop Muirhead in 1474, it is at the top of High St., the main thoroughfare in pre-Reformation times. At the S. end of High St. is the Tolbooth or town house, the seat of civic government, which occupied a site midway between the cathedral and the river Clyde.

Modern public buildings include the royal college of science and technology, the merchants' house, the stock exchange, and the royal exchange, all within walking distance of each other in the commercial and civic centre of the city. Farther W., near the university, is the Mitchell library, much used by students; it contains one of the best collections of Robert Burns publications in the world.

#### Plan of the City

The city, planned and laid out with the river as its S. boundary, was commended before the industrial revolution for its excellent houses, beautiful gardens, and lovely river walks. The streets then all radiated from the cathedral and the town house with High St., Gallowgate, Saltmarket, and Trongate as the chief promenades. Now, with over 1,000 miles of streets lined with residential tenements and commercial buildings, Glasgow has become one of the most congested towns in Europe.

Argyle St. is the busiest and most popular shopping thoroughfare, and runs almost from the E. to the W. boundary of the city. It is part of what was once the main road from the Firth of Clyde to the Firth of Forth. Sauchiehall St., running almost E. to W. from the royal infirmary to the art gallery, is a favourite shopping rendezvous for those who prefer Paris styles and Bond St. prices. Great Western Road, praised by John Ruskin as one of the finest avenues in Great Britain, leads almost from the west centre of the city to the Loch Lomond Boulevard, constructed after the First Great War. This by-passes Clydebank and Dumbarton, direct to Balloch, and is a busy motor route, summer or winter. A magnificent

panorama of the firth of Clyde can be seen from the Boulevard above Clydebank and Old Kilpatrick.

The Glasgow-Edinburgh road, 100 ft. wide, was constructed 1924-26 at a cost of £2,400,000. There are also excellent roads to the N., S., and W. Almost any part of Scotland can be reached by road from Glasgow within a few hours.

*Bibliography.* Glasgow Memorials, R. Renwich, 1908; History of the University of Glasgow, 1451-1909. J. Coutts, 1909; Medieval Glasgow. J. Primrose, 1913; History of Glasgow, G. Eyre-Todd, 1931; The Second City, Walkley, 1946.

**Glasgow, ELLEN.** Pen-name of Ellen Anderson Gholson (1874-1945), American novelist. Born at Richmond, Va., April 22, 1874, she took the name Glasgow because of her Scottish ancestry. She published her first novel, *The Descendant*, in 1897, and her other books included *Phases of an Inferior Planet*, 1898; *The Romance of a Plain Man*, 1909; *One Man in His Time*, 1922; *Barren Ground*, 1925; *The Romantic Comedians*, 1927; *The Sheltered Life*, 1932. Often describing life in Virginia, she drew powerful portraits of Southern characters. In 1943 she published *A Certain Measure: an Interpretation of Prose Fiction*. She was awarded the Pulitzer prize in 1941. She died at Richmond, Va., Nov. 21, 1945.

**Glasgow Bank Frauds.** The failure of the City of Glasgow Bank. Oct. 2, 1878, resulted in losses of over six millions sterling. Every shareholder was responsible to the extent of his fortune. More than half the whole number had less than £500 of stock, and only 88 stockholders held amounts of £2,000 and upwards. But among these was the bank itself, which held no less than £153,536.

The manager and several directors were tried at Edinburgh, Feb., 1879, on charges of falsehood, fraud, and theft, convicted on certain counts, and sentenced to terms of imprisonment varying from eight to 18 months.

**Glasgow Herald, THE.** Scottish independent newspaper, started by John Mennons, Jan. 27, 1783, as a weekly, under the title of *The Glasgow Advertiser*. It was published later twice a week as *The Glasgow Advertiser and Evening Intelligencer*, the old title was resumed in 1794, altered to *The Herald and Advertiser* in 1802, and finally to *The Glasgow Herald* in 1805. From a tri-weekly it became a daily on Jan. 3, 1859.

Mennons's successors in the editorship included Samuel Hunter,



George Outram, James Pagan, who instituted modern methods of reporting, William Jack, Dr. J. H. Stoddart, Dr. Charles Russell, Dr. William Wallace, F. Harcourt Kitchin, Sir Robert Bruce. Allied papers are *The Evening Times*, 1876, and *The Bulletin*, 1915. The proprietary firm, George Outram & Co., was converted into a public limited liability company in 1920.

**Glasgow Rangers.** Scottish football club, described under its correct title Rangers.

**Glasgow School.** Name associated from 1886 with a group of painters living in Glasgow. Its members included Sir David Cameron, J. E. Christie, Joseph Crawhall, junr., Sir James Guthrie, E. A. Hornel, Sir John Lavery, Harrington Mann, James Peterson, Alexander Roche, R. Macaulay Stevenson, and E. A. Walton. Consult *The Glasgow School of Painting*, D. Martin, 1902.

**Glasgow University.** Founded in 1451 by a bull of Pope Nicholas V, at the instance of William



Glasgow University arms

Turnbull, bishop of Glasgow, it found a home in the High Street: various Scottish sovereigns and other benefactors made gifts of land and property, and there it remained for about four centuries. In 1860 a new site was bought on Gilmorehill, where buildings in Early English style were erected; they included library, museum, classrooms, and houses for some professors. Sir Gilbert Scott was the architect. The buildings, opened in 1870, cost £500,000. Later, the Bute Hall and Randolph Hall were given by the benefactors after whom they are named. New buildings have been erected to house many departments.

The University has a chancellor and a rector. Its working head is the principal and it has faculties in arts, divinity, law, medicine, science, and engineering. In the 19th century it received many additional benefactions. Women equally with men are admitted to degrees. Affiliated is the royal college of science and technology, which provides courses for degrees in applied science. The University was at the height of its fame in the 18th century, when Adam Smith, Sir William Hamilton, John Wilson, and other noted scholars were educated here. Up to 1950 it united with the other Scottish

universities to send three members to parliament. Consult *The University of Glasgow*, 1451-1951, J. D. Mackie, 1954.

**Glashtin.** Mythical horse in Isle of Man folklore. It lived in the water, but frequently disported itself on the land with the native ponies. When the Manx ponies became crossed with horses from other countries the glashtin ceased to visit them.

**Glaspell, SUSAN** (1882-1948). American novelist and dramatist. Born at Davenport, Iowa, July 1,

1882, she was educated at Drake university and the university of Chicago, and became a reporter at Des Moines. Her plays included *Bernice*, 1920; *Inheritors*, 1921; *The Verge*, 1921; *Alison's House*, 1930, which gained the Pulitzer prize. Among her novels are *The Glory of the Conquered*, 1909; *Fidelity*, 1915; *The Road to the Temple*, 1926; *The Morning is Near Us*, 1940. She also wrote a biography of her first husband, G. C. Cook (d. 1923). She died July 27, 1948.

## GLASS AND GLASSMAKING

Ivor B. N. Evans, member of the Assoc. of British Science Writers

*The origins and development of glass from the earliest times are here described. See also articles on special kinds of glass, e.g. Irish Glass; Optical Glass; Stained Glass; Venetian Glass. See also Chemistry; Glass-like Plastics*

Glasses are substances which, when quickly cooled from the molten state, become solid without devitrification, *i.e.*, the formation of very small crystals. Most commercial glasses are a mixture of silicates; but certain glasses contain no silica, being made on a small scale for special purposes. The ingredients used in varying proportions are usually sand (silica) together with one or more of the following: soda ash, potash, magnesia, calcium and sodium phosphates and borates (for heat resisting glasses). High silica glass, used for laboratory ware, contains 80 p.c. silica, sheet glass 71 p.c.; optical flint glass, which has one-third the hardness of sheet glass, contains 40 p.c.

### The Softening Temperature

Glasses soften from 400° C. upwards; but have no definite melting point, so the point at which a thread 9 ins. long and 0.6 mm. diam. lengthens under its own weight at the rate of 1 mm. per min. in a furnace is taken as the softening temperature, which varies from 610° C. for lead glass, to 780° C. for high silica glass. The density varies from specific gravity 2.2 for borosilicate glass to 5.2 for very dense lead glass.

Glass will stand almost infinite compression, but breaks under tension; the surface containing, so to speak, the strength. Cutting with a diamond or cutting wheel reduces the strength, so that the glass breaks easily along the line of the cut.

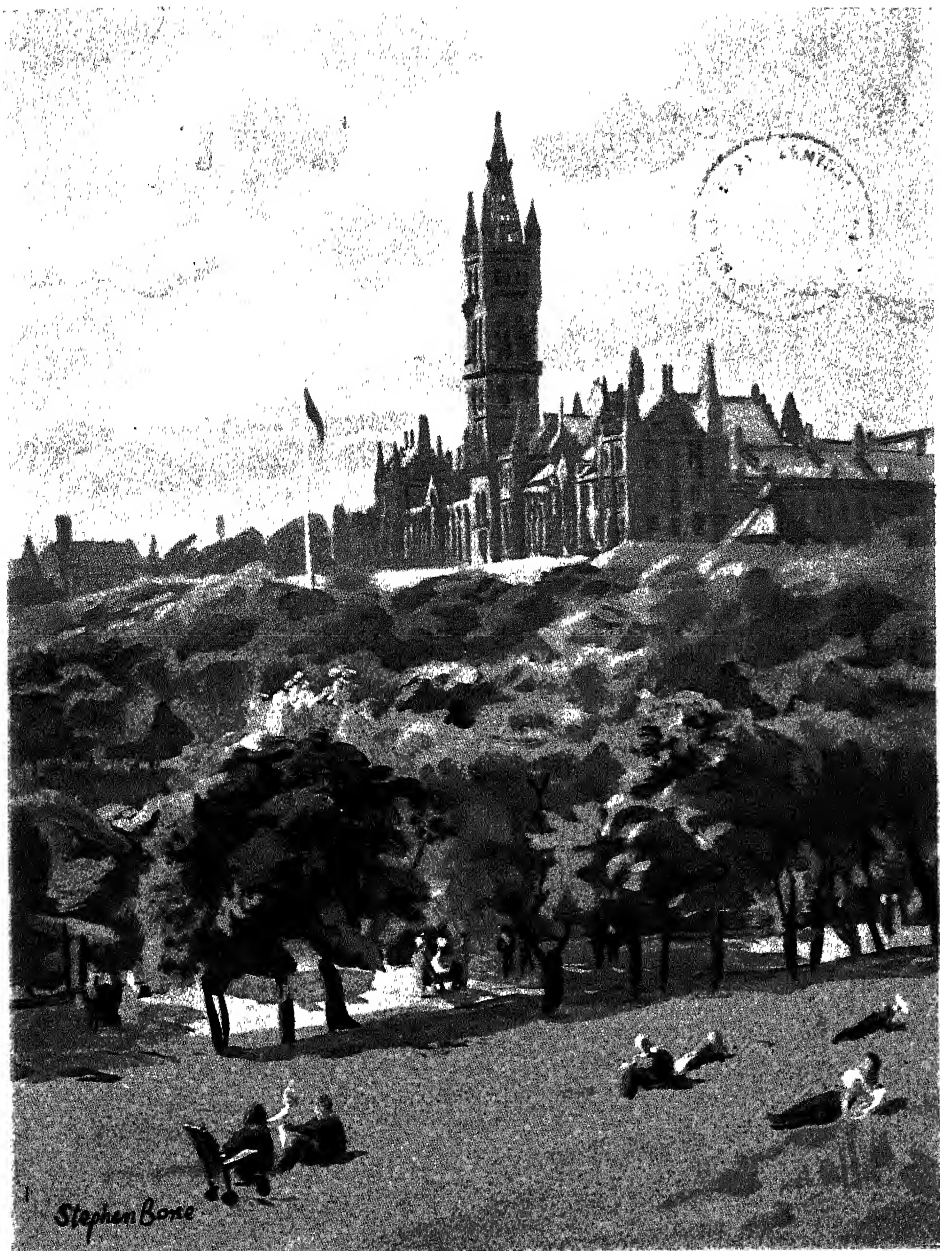
Glass is today indispensable in the house, in decoration, buildings, engineering, scientific research, radio, television, food, drink, and chemical manufacture and in electrical engineering.

The earliest glass known is a few pieces found in Egypt and attributed to Syria at about 5,500 B.C. Sidon and Damascus are believed to have been the world's original glass manufacturing centres, or "glassfields," the craft being introduced into Egypt about 2000 B.C. When Tamerlane sacked Damascus in 1400 A.D. the Syrian glass makers dispersed. This ancient glass was not transparent; it was coloured or opaque. In the 15th century B.C., the Egyptians developed glass-blowing, and the blown glass ware of the Greek and Roman period resulted.

### Early Egyptian Methods

About 1370 B.C. the Egyptians fused crushed quartz pebbles and wood ash alkali in earthenware pans, coloured the "metal" (molten glass) with green or blue frit. When cold the pan was chipped away, and the pieces, about 4 ins. to 5 ins. across and  $\frac{1}{2}$  in. to 1 in. thick, had the froth chipped off, leaving, for the first time, clear, coloured glass. The plate was heated again to the pasty state, folded and rolled with a metal bar to produce a cane of pencil diameter, which was heated and drawn to a cane about  $\frac{1}{4}$  in. diam. The hot cane was then wound round a copper mandril in the shape of a wide-mouthed vase, and the whole rolled hot until the surface was smooth. On cooling, the copper mandril contracted and was withdrawn to leave the glass vase. Decorative beads were in demand. About 1200 B.C. pressed and moulded glass articles were made.

In the 3rd century B.C. blown bottles and vessels were in common use at Sidon, where the Syrians first developed window or crown glass in the 1st century A.D. The

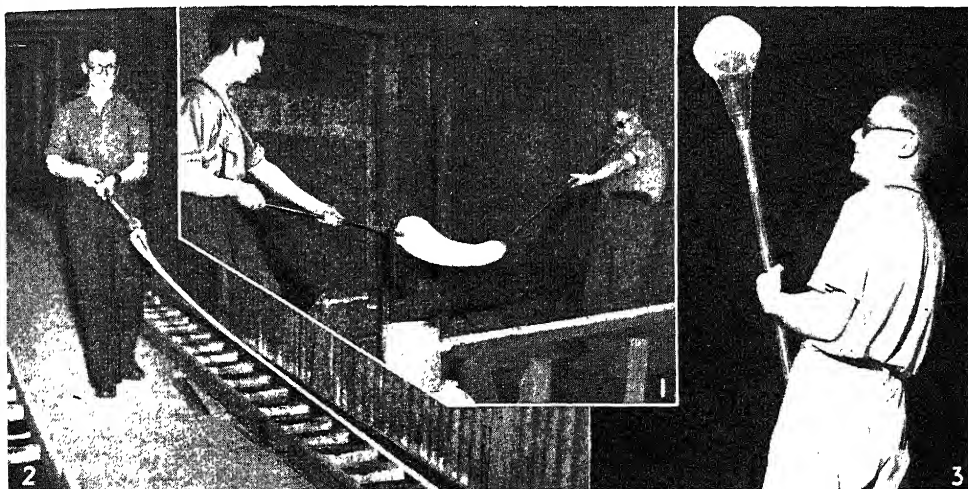


Sir Gilbert Scott designed the buildings in Early English style which were opened on Gilmore Hill in 1870 to house the University of Glasgow, oldest university in Scotland, founded in 1451. From the terrace on which they stand there is a clear view away to the great shipbuild-

ing yards of the Clyde; nearer at hand is the greenery of Kelvingrove Park, and the little river Kelvin winding round the foot of Gilmore Hill. Stephen Bone painted specially for the **NEW UNIVERSAL ENCYCLOPEDIA** the original from which this reproduction was made

# **GLASGOW UNIVERSITY : THE MAIN BUILDINGS SEEN FROM KELVINGROVE PARK**





Glass and Glassmaking. 1. Drawing a tube. The skilled tube drawer, on right, has started to walk backwards from his mate, and the tube is just becoming visible. 2. Drawing out thermometer tubing—almost completed: the length is approximately 40 yards and the bore is maintained throughout. 3. A skilled blower with a "gathering" of molten glass which will become a cathode ray bulb for radar

Alexandrians had a trade with Rome in cut and engraved glass.

Roman glass was roughly 69 p.c. silica, 17 p.c. soda, 11 p.c. lime, and 3 p.c. magnesia alumina and iron oxide. Enamelled glassware originated with the Syrians of the 1st century A.D. The Roman Empire spread glass-making to many European centres, nor did glassmaking disappear at the fall of Rome; Syrians were settled in the Seine-Rhine areas until the 7th century A.D.

About the 10th century A.D., a glassmaking industry was started at Venice as a closed guild with severe penalties for divulgence of its secrets. It required three generations to make a master-craftsman; but all changes were by rule of thumb, for not until the 18th and 19th centuries was glass studied scientifically.

#### Venetian Muranese Glass

Crown glass is made by blowing a large bubble, attaching a "pundy," or iron rod, to the pole opposite the blow-pipe, which is then removed, and spinning until the blow-hole opens out to become the periphery of a disk about 24 ins. diam. The Seine-Rhine glassfields and Normandy specialised in this, the latter supplying most of Britain's glass, particularly for the British schools of glass-painting. The Venetians' Muranese glass became famous throughout the medieval world as did their beads, spectacle lenses, ships' lanterns, and, after 1317 A.D., mirrors. The guild of mirror-makers was formed in 1569.

Plate glass, which is flat glass, with both sides polished so that they are parallel to each other, was made in France in the 17th century by casting glass into metal frames and rolling the surface, then grinding and polishing it when it was cold and annealed. This method used 2,000 lb. of glass per cast, and took 10 days to anneal.

#### Cylinders Forty Feet Long

The German method of blowing a long cylinder, 15 ins. or more in diam., cutting off the ends and then opening out to a plate in a furnace, invented before the 11th century, continued to be used for small quantities of special glasses into the 20th century. Cylinders up to 40 ft. long were blown mechanically at the end of the 19th century in the U.S.A.

The families of glassmakers, following receding forests for their fuel, spread to Bohemia and all over Europe. In France they enjoyed a high status until their spirit of religious independence caused their persecution, and they emigrated to England in Elizabeth's time. In the 13th century glassmakers at Dyers Cross had made glass for Westminster Abbey, the glazier's company had been formed in 1328 and a Royal charter granted to the glassfield at Chiddingfold; but, until the French glassmakers arrived English glass was inferior and most requirements were imported. In 1587 some Venetians in London invented lead glass.

In 1617 Sir Robert Mansell (d. 1653) obtained the glass monopoly,

becoming, by his granting of licences to Stourbridge and elsewhere, the father of the English industry. By 1696 there were 90 glasshouses, using sea-coal, in England and Wales. They manufactured crystal, flint, green bottle, window, and plate glass. London had 26 houses.

Casting of plate was introduced into England in 1773, crown glass by John Boles between 1678 and 1691. Plate glass manufacture and experimental development were restricted by a heavy excise tax and the development of lenses by an excise regulation forbidding crown glass to be manufactured thicker than  $\frac{1}{8}$  in. Taxes and restrictions were repealed in 1845, but so also were the import duties, and cheap foreign glass closed many small British works.

#### Ordinary Sheet Glass

With the assistance of the Frenchman, Georges Bontemps, Robert Lucas Chance introduced the manufacture of ordinary sheet glass into England in 1832. By that time British flint glass (lead-sand-potash) was world-famous for its brilliancy as cut table-ware, being manufactured at London, Stourbridge, Whittington, and Waterford, Ireland. The cutting process was introduced from Bohemia. In 1839 James Chance produced his patent plate, the thinnest produced to date, by grinding the sheets on slates coated with leather and felt. In 1841, James Hartley, at Pilkingtons, Sunderland, manufactured thin, cast sheet glass to any size

and down to  $\frac{1}{8}$ -in. thick; it had a fluted pattern impressed upon it.

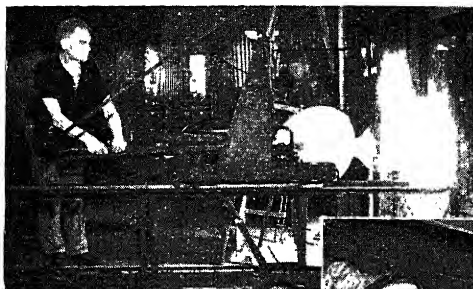
In 1851 Chances supplied the  $1\frac{1}{2}$  million square feet of glass for the Crystal Palace. They next developed cathedral glass, which has one side impressed with an irregular pattern, and figured glass, with deeper, regular patterns, by feeding the glass into marked rollers and producing the figured sheet with both sides brilliant.

The 1,000 tons capacity tank furnace was also developed, being about 30 ft. by 120 ft. by 5 ft., with fireclay walls and a roof of silica brick, to the Siemens regenerative design. The ingredients

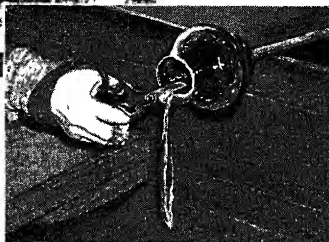
free. The edge-bowl method developed by the Pittsburgh plate glass company consists of merely the cooled, slotted ends of the Fourcault slit or débiteuse, which cools the edges and maintains the width of the glass. The composition of sheet and plate glass is, ordinarily, similar: 72-73 p.c. silica, 13-14 p.c. lime, 0.5-1.5 p.c. alumina, 14-15 p.c. soda.

The grinding and polishing of cast plate glass, begun in 1688 when the glass had to be cast at least 50 p.c. thicker than the final product, steadily evolved until a method was developed in which the glass was embedded in plaster

of Paris on rotating steel tables 30 to 40 ft. in diam. The grinder of iron shod disks was first fed with sand and water, then fine sand or emery, and the perfectly flat.



Glass and Glassmaking. Placing a "gathering" into the "glory hole" to be warmed up. When warm enough, the glass will be stretched, slit, flattened, and made into a square sheet. Right: a partly shaped fruit dish, on the punty iron, is being sheared



are introduced at one end and the molten glass comes out at the other, the highest temperature, with the glass at about 1,500° C. and watery to allow bubbles to escape to the surface, being one-third of the way across.

The cut cylinder method and casting from ladles have been displaced by semi-continuous and continuous processes. Fourcault, in Belgium, in 1904, patented his method of drawing a stream of glass through a fireclay slot floating on molten pasty glass, and achieved complete success in 1913. The sheet, drawn up by water-cooled rollers, passes into the annealing tower at the rate of 120 ft. per hr. On reaching the top the sheet is cut at convenient lengths. Unfortunately, glass crystals gradually form on the slot, scratching the sheet with "music lines."

In the Colburn or Libby-Owens process patented in 1905, two small rollers maintain the width of the vertically drawn sheet, which is then re-heated and drawn horizontally over a roller into the annealing lehr. The surface is spoiled by the bending, but is dirt

smooth silky texture obtained was washed with rouge and water. The sheet was then relaid with the polished side on cloth and the operation was repeated. The Bichroux process substituted for the casting table two rollers fed with glass poured from a pot on to a smooth sheet behind the feed rollers; the glass sheet emerging being cut by a descending knife when it reached the end of the delivery table. The sheet was annealed and then polished. Glass made in this way does not cackle on cooling as does cast glass, and less glass has to be removed by grinding and polishing to secure parallel surfaces.

The motor car has created an enormous demand for plate glass. The Ford process discharges a continuous sheet, from one end of a continually supplied furnace, into two rollers. At first the sheet produced was only the width of a windscreen, but after 1923 Pilkingtons introduced modifications by which high-grade sheets of glass 100 ins. wide could be produced by this method. Most plate

glass is now made by the continuous tank method.

Both Ford and Pilkingtons developed a method for continuous grinding and polishing. The sheet, after leaving the rollers, was put through an annealing lehr and was then cut up. The rough sheets were laid on tables, whose ends met at a level, flush joint, which slid on guides under motor-driven grinders and polishers. Some plants were 800 ft. long, and licences to operate the Pilkington method on glass up to 15 ft. wide were granted to the U.S.A., France, and Belgium. By this method very thin sheets of ground plate glass could be made, and laminated "safety" glass, in which a sheet of gelatine was sandwiched between two thin plates and the perimeter sealed, became universally available for motor cars.

Glass is coloured by the addition of cobalt for blue, chrome for yellow-green, manganese for violet, nickel for green, and so forth. The colouring ingredients either form transparent silicates or become so finely divided that the particles scatter the light, allowing only certain colours to be transmitted in the process.

#### Wired Glass

Wired glass, where electrically welded mesh is embedded in continuous sheet glass, was developed by Pilkington Bros. in 1898. Spun "glass silk," or fibreglass, was first manufactured by Chances in 1930, the molten glass being forced through fine, heated dies. Woven in tapes, it provides a very thin insulation, unaffected by climate or insects, for the wires in radar sets. In mats, quilts, or blankets, it is used to insulate heat, for filters, cinema screens, tire fabrics, tablecloths, etc.

Toughened or tempered glass, armourplate, is a French invention. Unless glass is annealed, the internal stresses become so great that they overcome the surface strength and the glass cracks. In armourplate the two surfaces of a sheet are cooled quickly by blasts of air, with the result that the compressive forces of the "skins" are far greater than expanding internal forces. The breaking strength of such glass is 50 to 300 p.c. greater than that of ordinary glass. When broken by a scratch or projectile it falls into fragments, free of cutting edges.

Opal glass, which the Egyptians discovered about 300 A.D., is clear glass with millions of small particles of glass of another refractive index per c.c. It gives a sea-mist

effect produced by adding phosphates and fluorides to the metal. Flashed glasses are clear glasses thinly coated with coloured glass.

Glass tumblers and electric lamp and valve globes are blown on multiple automatic machines, whose plungers pick up a measured amount of glass from a tank and blow it into a globe, given its final, exact shape in a mould. Other machines place molten glass in a mould and bring down a plunger producing a pressed article, such as thick tumblers, heat-resisting oven-ware, lens and prism blanks, which are afterwards ground to their precise forms. Britain now leads in the manufacture of the highest quality lenses for cameras and for lighthouses. In fact, most of the coasts of the world are lit by lighthouses fitted with British lenses. Hollow glass bricks are made in two halves by pressing, the two parts being sealed together in the annealing lehr. These thick glasses are of borosilicate to withstand temperature changes without undue expansion.

#### Twin Plate Glass

Twin plate, a British invention of the Second Great War years, is produced by introducing the ribbon of plate glass continuously, without cutting, into the grinders and polishers, which act on both sides simultaneously. One furnace can produce 160 sq. ft. of glass per min. continuously, day and night, all the year round.

Stourbridge produces beautiful blown glass vessels, while glasses have been developed to transmit or to screen ultra-violet radiation, to deter flies, to absorb the heat rays from the sun, thus keeping a room's air and inhabitants cool, and for other specialised purposes.

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**Glassites.** A Scottish sect, founded by John Glas. He taught that all Church establishments were unscriptural, and that each congregation should be self-governing and have the power to appoint its own ministers. The publication of his views in *The Testimony*

of the King of Martyrs, 1727, led to his suspension by the synod of Angus, and in 1730 he was deposed from the ministry. He founded several congregations, better known as Sandemanians, after one of the more conspicuous elders, Robert Sandeman, son-in-law of Glas. The sect adopted the practices of community of goods and abstinence from certain foods.

**Glass-like Plastics** OR ORGANIC GLASSES. Those plastics which have the primary characteristic of glass—transparency. The search for a non-breakable glass has been the incentive behind much work on plastics. Glass-like plastics are in the main derivatives of the hypothetical vinyl radical, and include polystyrene and its derivatives, certain vinyl polymers, polymethyl methacrylate, allyl polymers, and some ketone condensation resins.

Except for the allyl polymers, these are thermo-softening, and can be manipulated in sheet or rod form by the application of moderate heat. They have reasonable resistance to shock except at very low temperatures, and are of low specific gravity, being mostly slightly denser than water. In sheet form they are used for aircraft screens and generally where protection and good vision must be combined. Rods of polymethyl methacrylate, with their remarkable transparency, are wanted for surgical instruments. Other uses of glass-like plastics are in television apparatus and the production of lenses for industrial and ophthalmic purposes.

**Glass Paper.** Sheets of paper coated with powdered glass for use as an abrasive. Glue or some other adhesive is applied to the paper, which is then sprinkled with a layer of the abrasive material in a determined thickness and closely controlled grade of fineness. Glass cloth is a similar, more durable material in which the backing is a fine twill. Glass paper or cloth is used for finishing and smoothing woodwork, rubbing down painted surfaces, etc. To prevent the dust which would arise from rubbing down paintwork dry (and which might be harmful to the worker), glass-paper is made with a water-resistant adhesive so that it can be used on the previously wetted surface of the paintwork.

The name is applied somewhat loosely to materials in which the abrasive is a substance other than glass. Sand paper is coated with sharp sand in various grades,

made and used as glass paper. Other natural and artificial grits are employed, some of the carborundum class. Emery paper and cloth, coated with emery powder, are used for finishing metal surfaces.

**Glass-sand.** Sand suitable for the manufacture of glass. Most sands contain a high percentage of quartz, together with other constituents, commonly feldspar and lesser amounts of other minerals; but high-grade glass requires sand having a silica percentage of nearly 100. The sand should be of fine to medium grain, and individual grains should be angular. There should be no iron oxide to form a yellow coating on the grains. Some impure sands are still suitable for bottle glass. The purest glass-sands come from Fontainebleau and Lippe, where they carry only 0.02 p.c. of impurities. Good British varieties are obtained from the Lower Greensand formation of Cretaceous age in Kent, Surrey, Bucks, and Beds.

#### Glass Sellers' Company.

London city livery company.

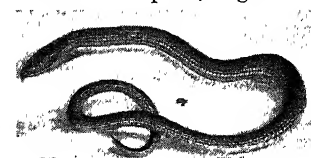


Glass Sellers' Company arms

Incorporated in 1664, it has one trust, the John Abbott scholarship of £50 tenable by a scholar of the City of London School at Oxford or Cambridge. The offices are 32, Victoria St., London, S.W.1.

#### Glass Snake (*Ophisaurus*)

The popular but erroneous name for the Scheltopusik, a genus of

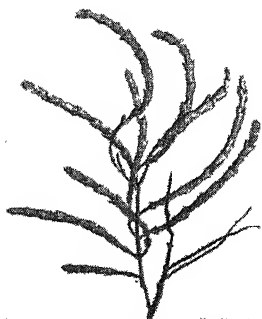


Glass Snake, a legless lizard, over a yard in length

lizards found in Hungary, Greece, Russia, S. Asia, and N. America. It is snake-like in form, the limbs being absent or rudimentary, and the body covered with scales. It is perfectly harmless, and feeds on mice and snails. See Lizard.

**Glasswort** (*Salicornia europaea*) OR MARSH SAMPHIRE. Annual leafless herb of the family Chenopodiaceae. A native of Europe, N. Africa, W. Asia, and N. America, it has juicy, jointed stems and branches, joints spindle-shaped. The minute flowers are in pairs, sunk in a pit in the joints of the branches, and have no petals. Glasswort grows in salt marshes, and was so





Glasswort or Marsh Samphire. A leafless herb with fleshy branches

called from having been burnt formerly to obtain soda from its ashes (*Barilla*) for use in glass-making. Its joints are pickled as a substitute for real samphire (*Crithmum*). See *Chenopodiaceae*.

**Glastonbury.** A borough and market town of Somerset, England. It stands on the Brue,  $5\frac{1}{2}$  m. S.W. of Wells, has a railway station on the old Somerset and Dorset line. It is chiefly famous for its abbey ruins, remains of a great monastic house, belonging to the Benedictines, which flourished here until the Reformation. The most complete of the ruins is that of S. Joseph's Chapel, really the Lady Chapel, and they show that the abbey church must have been one of the largest and noblest in England. Near to it is the abbot's kitchen, an octagonal building, and some distance away is his barn. In the town is the abbot's justice room. The abbey was one of the richest in England and its buildings covered 40 acres.

The chief buildings of the town are the Perpendicular churches of S. John the Baptist and S. Benedict. The George Inn was a house for pilgrims. There is a museum with prehistoric exhibits.

At the beginning of the 7th century the Benedictines founded a monastery. It was replaced by one which Dunstan, as abbot here, restored and enlarged in the 10th century. This was destroyed by fire in 1184, whereupon a finer one was erected, which lasted until the dissolution of the monasteries. Until 1907 the ruins were in private hands, after which they were transferred to the diocese of Bath and Wells. Tradition ascribed the foundation to Joseph of Arimathea, who, it is said, built a church here and planted the thorn which bloomed once a year on Christmas Day. It was long a place of pilgrimage. The town, which grew up around the abbey,

was given municipal privileges in 1706. Market day, Tues. Pop. (1951) 5,081. (See *Abbey* illus.)

The Glastonbury lake-villages are two late Celtic settlements of crannog type. Discovered in 1892 by Arthur Bulleid (1862–1952), the principal one was formed upon the fringes of a morass by pile-surrounded brushwood fascines. Beneath peat mounds 90 wattle-and-daub round huts, 18 ft. to 35 ft. across, were traced within  $3\frac{1}{2}$  acres. The stratified floors, successively remade and rehearthed as the foundations subsided, indicate 150 years of village life before the Roman occupation. The rarity of weapons—7 out of 109 iron objects—betokens a peaceful settlement with several local industries. A settlement discovered in 1908 at Meare, 2 m. N.W. of Glastonbury, contained similar remains.

**Glatz** (Pol. *Kłodzko*). Town and former fortress of Silesia. Placed under Polish administration 1945, it is on the Neisse, 58 m. S.S.W. of Breslau (Wrocław). It has a reputedly 14th-century church and other old buildings and monuments, a bridge of the 14th century, and a town hall and museum. The lofty keep of its old castle stands on a 1,200-ft. hill, into whose rocks the former citadel was cut. A German township from 1275, Glatz belonged until 1742 to the Bohemian crown. Late in the Second Great War it fell to Russian troops. It makes machines, furniture, shoes, and cigars.

**Glauber, JOHANN RUDOLPH** (1604–68). A German alchemist. Born at Karlstadt, afterwards living at Strasbourg, Basel, Frankfurt-on-Main, and Cologne, he died in poverty in Amsterdam. His name is perpetuated in Glauber's salt, which he discovered and lauded as a medicine.

**Glauber's Salt.** Sodium sulphate,  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ , colourless crystals soluble in water. The dose is 30 to 120 grains for repeated administration;  $\frac{1}{4}$  to  $\frac{1}{2}$  oz. for single administration. It is often a useful purgative in conditions resulting from sluggish liver. It is named after its discoverer (*v.s.*).

**Glauchau.** Town of E. Germany. It is situated on the right bank of the Mulde, 8 m. N.N.E. of Zwickau, and due W. of Chemnitz (Karl Marx Stadt), and is a textile and tool manufacturing centre, and has two castles preserved from the 16th cent. Pop. (est.) 32,000.

**Glaucoma** (Gr. *glaukos*, bluish green). Disease of the eye characterised by an increase of tension or

pressure of the fluids within the eyeball. In chronic glaucoma, gradually increasing dimness of vision is usually the first symptom, and in some cases rainbow colours are seen round the margins of lights. In acute glaucoma, pain in the eyeball, often radiating over one side of the head, is a symptom, and vision is affected.

Hardness of the eyeball is an important diagnostic sign. Glaucoma is very serious, and if not promptly treated may lead rapidly to permanent blindness. The general principle of treatment is to remove a portion of the iris so as to allow some of the compressed fluid to filter into the anterior chamber of the eye. See *Blindness*; *Eye*.

**Glaucinite.** Dull green mineral, essentially a hydrous silicate of iron and potassium, composition variable. It occurs in colloidal, amorphous, and crystalline form in certain rocks of nearly all geological ages; it is abundant in the "green sand" of the Chalk formation and in ocean sediments near the continental shores.

**Glaucophane** (Gr. *glaukos*, bluish green; *phainesthai*, to appear). Member of the monoclinic amphibole group of minerals. Essentially a silicate of sodium, aluminium, and iron, with some magnesium, it is of variable composition. It occurs as vitreous to pearly crystals or masses with a grey-blue colour in metamorphic rocks, such as schist, eclogite, marble, etc. Comparatively rare, it is usually associated with quartz, epidote, pyroxene, etc.

**Glaucus.** Name of three personages in Greek mythology. They are the builder of the Argo, the ship of the Argonauts (*q.v.*), ultimately a sea-god; the father of Bellerophon; and a Lycian hero slain by Ajax.

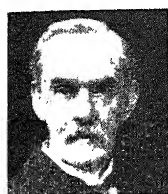
**Glaucus.** Genus of opisthobranch gastropod molluscs, found floating on the surface of the Atlantic and Pacific oceans. They resemble green slugs with six heavily fringed lobes on the body. Glaucus, or Wonders of the Shore, is the title of a book by Charles Kingsley, 1855. See *Gastropoda*.

**Glaze.** Layer of pure or mixed transparent colour thinly applied to an oil painting to improve its tone, to impart mellowness, to protect the surface, and to facilitate its being cleaned without risk of injury. The old masters achieved some of their most subtle colour effects by means of their glazes painted over a solid monochrome basis. This was one of the traditional methods of the great

schools, contrasting with the "direct" method, *i.e.* the direct application of solid colour to the canvas, adopted by such painters as Hals or (later) Raeburn, and in general use by the end of the 19th century.

Glaze also plays an important part in the manufacture of pottery and porcelain. At the stage known as the biscuit state, the ware is dipped in glaze, which either gives it a finished appearance, or, in decorated porcelain, forms the ground on which the painting is applied. See Tiles.

**Glazebrook, Sir RICHARD TETLEY** (1854-1935). British physicist. Born at Liverpool, Sept. 18,



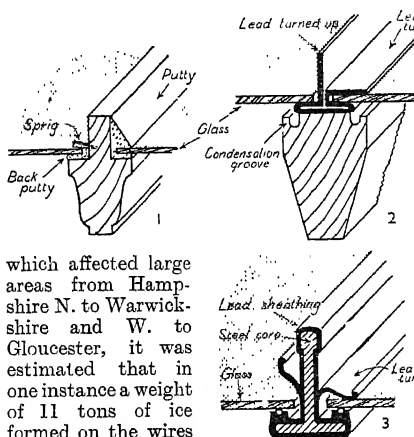
Sir R. Glazebrook,  
British physicist  
Russell

1854, he was educated at Dulwich, Liverpool College (later the university), and Trinity, Cambridge. Demonstrator at the Cavendish Laboratory from 1880, he became assistant director in 1890. He served a year as principal of University College, Liverpool, but in 1899 became first director of the National Physical Laboratory, a position from which he retired in 1919. During 1920-23 he was director of aeronautics at the Imperial College of Technology. He was chairman of the Aeronautical Research Committee 1909-33. One of the most distinguished physicists of his generation, he was chiefly concerned with optics and electricity. He issued textbooks on heat, light, mechanics, and electricity; was the author of *Science and Industry*, 1917, and edited the *Dictionary of Applied Physics*. Knighted in 1917, he was awarded a Hughes medal in 1909, and Royal medal in 1931. He died Dec. 15, 1935.

**Glazed Frost.** Transparent smooth coating of ice, in contrast to hoar frost and rime which are white and opaque, on roads, trees, buildings, etc. It is caused chiefly by the freezing rain as it falls on the ground or objects the temperature of which is below freezing point. Clear ice can also be formed with the sudden arrival of a warm, damp wind; moisture in the air then condenses on the still cold surfaces, where it becomes solid. When sharp frost sets in after a partial thaw, melting snow or ice freezes again, giving roads the appearance of glazed frost. True glazed frost, however, is infre-

quent in the U.K. and more common on the Continent. In the eastern U.S.A. it is formed by a southerly wind blowing from the sea over frozen land.

Severe ice storms can produce rapidly heavy accumulations of ice, which besides interrupting transport interfere with communications by bringing down telegraph wires and poles. In the great storm of Jan. 26-27, 1940,



Glazing: 1. Wood glazing bar with putty. 2. Wood glazing bar with lead cover. 3. Steel lead sheathed puttyless bar. 4. Reinforced concrete puttyless bar

which affected large areas from Hampshire N. to Warwickshire and W. to Gloucester, it was estimated that in one instance a weight of 11 tons of ice formed on the wires between a pair of telegraph poles. On high ground the short-circuiting of insulators of over-head power cables may cause breakdown in electrical supply.

Although a risk of glazed frost can be forecast, it is difficult to be certain that it will actually occur. For instance, if a warm S.W. stream of air from the Atlantic brings rain into a region of hard frost, glazing will almost certainly occur on the ground; but glazing on overhead wires requires an air temperature below 32 F. Rain falling through such a freezing layer near the ground may arrive in a supercooled state, freezing on the first object it touches, or it may freeze before then into pellets of ice which will fall to the ground.

**Glaziers' Company.** London city livery co. It was recorded at Guildhall in 1328, incorporated in 1638, and granted a charter by James II in 1685, annulled by parliament in 1690. Elizabeth II granted a supplemental charter in 1956. The offices are at Candlewick House, 116, Cannon Street, E.C.4.

**Glazing.** The setting of panes of glass in a suitable frame.

Frames are usually rebated (Fig. 1), but sometimes they are grooved, to receive the edges of the glass. Glass may be fixed in a simple frame or in a frame divided by glazing bars. The latter are rebated to provide a means of fixing the glass edges, just as the frame is.

The glass may be fixed by puttying and sprigging; beading; or covering the edges with metal strip. In windows and glazed doors puttying is usually adopted. The sprigs are small metal tacks driven into the edges of frames and glazing bars to secure the glass while the putty is applied, but

before fixing the glass in this way the rebates are given a thinly spread backing of putty. The glass is then pressed on to this putty seating, the sprigs are driven in, and the front putty is applied and smoothed off with a special knife. Linseed oil putty is used for wood frames and metallic putty for metal frames. The putty should be painted before it sets hard.

Beaded glazing means fixing a wood or metal beading with small screws to secure the glass in the frame or glazing bars. Narrow strips of washleather are bent round the edges of the glass to act as a cushion. Puttyless glazing bars with metal strip covering to secure the glass are widely used in roof glazing, lantern lights, and glazed walls; they are of wood, steel, and reinforced concrete. The wood bar shown in Fig. 2 has a lead capping turned down to cover the glass edges. The condensation grooves drain away moisture running down the underside of the glass. Metal glazing bars are usually of inverted tee section, protected against corrosion by lead sheathing or galvanising. A seating for the glass is formed in either lead or asbestos cord (Fig. 3). Reinforced concrete glazing bars

are pre-cast under pressure in steel moulds. The capping is of copper held to the bars by brass or copper screws, nuts, and washers. The bars are grooved for asbestos cord seating (Fig. 4).

In all kinds of glazing the pane should be slightly less in size than the opening, so that shrinkage and expansion and contraction cannot crack the glass. Puttyless glazing has the advantage of allowing the glass to be easily renewed if broken, and protected metal and concrete bars do not need painting, as they are rot- and rust-proof.

**Glazing.** In photography this process consists in squeezeing a wet print on to a highly finished surface, e.g. a sheet of polished plate glass, stainless steel, chromium, etc. When dry, the print is stripped from the plate, having attained a high gloss. Where quantities of prints are concerned, glazing is carried out in machines incorporating polished rotating drums.

**Glazounov, ALEXANDER CONSTANTINOVICH** (1865-1936). Russian composer. The son of a publisher in St. Petersburg (Leningrad), he was born Aug. 10, 1865, received a musical education, and was advanced by Balakirev and Rimsky-Korsakov. A symphony composed at 16 revealed his masterly approach to orchestral technique. Glazounov first conducted at the Paris exhibition of 1889, became a professor at St. Petersburg conservatoire in 1900, and was director from 1906 until the Revolution of 1917. He died March 21, 1936.

Of all Russian composers Glazounov was the most susceptible to Western influence, notably that of Brahms, with whose symphonies his No. 6 in C minor (he wrote eight) will bear comparison. He excels at theme and variations, e.g. in this symphony and the set for piano, op. 72. The melancholy in his violin concerto and piano concerto is far more restrained than that of Tchaikovsky, and he can rise to a strain of mysticism. A more Oriental note is sounded in the symphonic poem *Stenka Razin*, and his ballet music, *The Seasons*, and *Raymonda*, is full of colour.

**Gleaning** or **LEASING**. Gathering what is left after harvest, usually corn, but sometimes grapes or other produce. By the Mosaic law the farmer was expressly commanded to leave the gleanings of his fields and vineyards for the poor and the stranger, and was forbidden even to "wholly reap the

corners" of the fields; and from remotest times the poor have been almost universally allowed to glean.

In England the public are not legally entitled to glean, but are seldom turned off. In some districts gleaning is done by the farmer's and harvesters' families.

**Glebe** (Lat. *gleba*, clod, land). Term in ecclesiastical law for land belonging to a benefice. It was formerly held to be essential that each parish should possess a house and glebe land for the support of the parson. The glebe might be farmed by the parson, or, subject to certain restrictions, let on lease in consideration of an annual rental, or in certain circumstances sold or exchanged. Legislation has enabled parishes to get rid of what was often a source of loss rather than of income. See *Tithe*.

**Glee.** English vocal concerted work in three or more parts. It is for solo voices, unaccompanied and usually male, the style being non-contrapuntal. The word is derived from the Anglo-Saxon "gligg," music, and has little connexion with gleeful. Standard glee writers are Webbe, Battishill, Callcott, Cooke, Attwood, Horsley, Mornington, Danby, Stevens, Spofforth, Storace, Savile, Este, Paxton, Arnold, Mazzinghi, Shield, and Ford.

**Gleichenia.** Genus of ferns of the family Gleicheniaceae. Natives of the tropics, they have creeping



*Gleichenia*. Feather-shaped fronds of *Gleichenia acutifolia*

rhizomes, and the leafy portion of the frond is forked, the two divisions being then subdivided after the manner of a feather.

**Gleiwitz** (Pol. Gliwice). The second city and chief industrial centre of the former German province of Upper Silesia. It is on the Klodnitz (Glimichi) and a canal, 16 m. W.S.W. of Beuthen. Founded as a German township in 1276, Prussian from 1742, Gleiwitz grew with the development of coal mining and heavy industry from 20,000 inhabitants

in 1890 to 117,666 in 1939. It has two 16th century churches. The mines and big industrial plants were not without parks and pleasant suburbs between them; but as a rly. and air junction Gleiwitz suffered heavily from Allied bombing before being captured by Koniev's 1st Ukrainian army, Jan. 25, 1945. It came under Polish admin. 1945. Pop. est. 88,000.

**Glen.** Narrow valley through which a river flows, or one between two hills. The word is of Celtic origin; hence the frequency of the word in place-names in Scotland and Ireland. The Gaelic form is *gleann*, valley.

**Glen Affric.** For this Scottish glen, and the river and lake of the same name, see *Affric*. See also *Hydro-Electric Installations*.

**Glenalmond.** Glen or valley of the Almond river, Perthshire, Scotland. It is about 20 m. long, and the most beautiful portion of it is called *Sma' Glen*. On the right bank of the Almond stands Trinity College, the first school in Scotland to be modelled (1841) after the English public schools. The buildings include a chapel, laboratories, engineering shops, gymnasium, library, etc. In the glen is the reputed grave of Ossian.



*Glenalmond. Arms of Trinity College*

**Glencairn, EARL OF.** Scottish title borne by the family of Cunningham from 1488 to 1796. The first earl was Alexander Cunningham, a lord of parliament, killed when fighting for James III against some rebels in 1488. Alexander, the 5th earl (d. 1574), was concerned in the troubles of Scotland under Mary Stuart; at times he was with the reformers and at others with the queen. William, the 9th earl (d. 1664), was responsible for the rising in Scotland in favour of Charles II which is named after him. He led this in 1653, but it soon collapsed and he was imprisoned; later he became lord chancellor of Scotland. The 14th earl, James, who died childless in 1791, is known as the friend of Burns, who wrote a *Lament* on his death (beginning *The wind blew hollow frae the hills*). His brother, the 15th earl, died childless in 1796, and the title became extinct.

**Glencoe.** Glen in Argyllshire, Scotland. It extends for 10 m. W. from Buchaille Etive to Loch



Glencoe. The rugged Argyllshire glen in which the Macdonalds were massacred in 1692

Leven, an E. arm of Loch Linnhe. It lies among magnificent mountain scenery with peaks rising to 3,800 ft. The motor road A82, completed 1934, is remarkable both scenically and as engineering. The locality is the scene of exciting episodes in Stevenson's *Kidnapped*.

The glen is noted for the massacre which took place on Feb. 13, 1692. After the suppression of Dundee's Jacobite insurrection of 1689, many Scottish clans remained disaffected, and the Scottish government, chiefly controlled by Lord Stair, his son, and Lord Melville, proclaimed an amnesty to all who should take an oath of allegiance by Dec. 31, 1691. The chief of the MacIans of Glencoe (a branch of the Macdonalds) put off doing so till the last moment and, there being no magistrate at Fort William when he went to take the oath, was compelled to proceed to Inveraray, with the result that the oath was not taken till Jan. 6. His old enemy, the master of Stair, took advantage of this, obtaining an order from William III for the extirpation of the Macdonalds as dangerous irreconcilables.

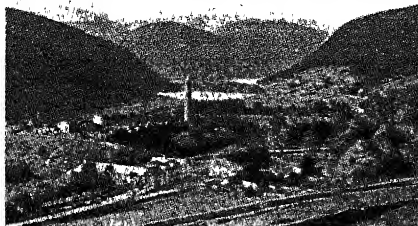
The order was carried out by the Campbells, also the inveterate enemies of the Macdonalds. Arriving in the glen as friends, they were given hospitality by the unsuspecting inhabitants. In the night they rose and treacherously murdered their hosts, while many Macdonalds who escaped actual massacre perished in the mountains. It is averred that William signed the order without reading it. *Consult* Massacre of Glencoe, G. Gilfillan, 1912; Massacre of Glencoe, J. Buchan, 1933.

**Glencoe.** Village of Natal, S. Africa. It is 231 m. N.N.W. of Durban by rly., on the main line to Johannesburg and branch line to Vryheid and Ermelo. Its altitude is 4,303 ft. Near here the opening operations of the South African War took place in 1899.

**Glendale.** City of California, U.S.A. in Los Angeles co., at the S. end of the San Fernando Valley. Situated 6 m. from the heart of Los Angeles, it is served by rlys. and an airport. A centre of aircraft industry during the Second Great War, it manufactures aeroplanes and engines, tools

and dies, furniture, medical goods, pottery, and tiles. Originally part of the first Spanish land grant in California, it began its existence about 1880 with the breaking-up of ranches. It was incorporated in 1906. Here are the Little Church of the Flowers and the Wee Kirk o' Heather and an academy maintained by Seventh Day Adventists. Pop. 82,582.

**Glendalough.** Valley of Ireland, in co. Wicklow. 8 m. N.W. of Rathdrum, a station on the



Glendalough, Ireland. The glen and old city, with the ancient Round Tower

state rlys., it is famous for its beauty and its eccles. ruins. The glen, 2 m. long, is enclosed by mts. which in places reach over 2,000 ft. It is traversed by the Glenealo, which in it forms two lakes. Glendalough as a town was the seat of a bishop from the 6th century to the 13th, after which, having been plundered, it fell into decay. The ruins are known as the Seven Churches, these being the cathedral, Our Lady's Church, S. Kevin's Kitchen (the most complete), the ivy church, the priory, and two others. Most were founded by S. Kevin. There are also a fine round tower and a cross.

**Glendower, H.M.S.** A naval training station of the Second Great War established near Pwllheli, Carnarvonshire, Wales. The station was closed down in July, 1946, and its ensign laid up in Bangor cathedral. The site was converted into a holiday camp.

**Glendower, OWEN** (c. 1359-c. 1416). Welsh patriot. Also known as Owen ap Gruffydd, he claimed descent from the old Welsh princes. He studied law at Westminster, fought for Richard II against the Scots in 1385, and entered the service of Henry of Lancaster. After Henry IV's accession he became the champion of Welsh independence, assuming the title of prince of Wales and summoning a Welsh parliament, and spent the rest of his life in resistance against English domination.

He thrice defeated the English, aided the rebellions of Hotspur and Mortimer, and in 1404 made an offensive alliance with France against England. In 1408-09 he suffered serious reverses at Prince Henry's hands. The date and manner of his death are uncertain. The hero of many Welsh legends, Owen also figures in Shakespeare's *Henry IV.* *Consult* O. G. and the Last Struggle for Welsh Independence, A. G. Bradley, 1901; Owen Glendower, J. E. Lloyd, 1931.

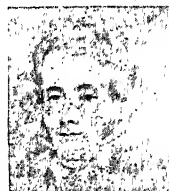
**Gleneagles.** Locality in Perthshire, Scotland. It has a rly. junction 17 m. N.E. of Perth and a fine hotel, and became in the 1920s a fashionable resort for golfers. Pop. 486.

**Glennelg.** River of Victoria, Australia. It drains the S.W. corner of that state from the Grampians and debouches at the head of Discovery Bay at Nelson, near the South Australian border. Its length is 260 m.; it is

un navigable and in dry seasons its bed is bare through evaporation.

**Glennelg.** Seaport and watering-place of S. Australia. It stands on Holdfast Bay, 6 m. by rly. S.W. of Adelaide. S. Australia was proclaimed a British colony here, 1836.

**Glennelg, CHARLES GRANT, BARON (1778-1866).** British statesman. Born at Kidderpore, Bengal, Oct. 26, 1778, and educated at Magdalene College, Cambridge, he was called to the bar, and entered parliament in 1811 as member for the Inverness and Fortrose burghs. Made



Charles Grant, 1st Baron Glennelg After J. Slater

a lord of the treasury in 1813, a privy councillor and Irish secretary in 1819, he became vice-president

in 1823 and president in 1827 of the board of trade, and of the board of control in 1830. In 1835 he was raised to the peerage and made colonial secretary, but was forced to resign in 1839 on account of his vacillating Canadian policy. He died childless at Cannes, April 23, 1866. His title was taken from his estate in Scotland.

**Glenesk**, ALGERNON BORTHWICK, BARON (1830-1908). British journalist. Born at Cambridge,



Algernon Borthwick,  
1st Baron Glenesk  
Haines

Dec. 27, 1830, eldest son of the editor of the *Morning Post*, he was Paris correspondent of that paper in 1850, and succeeded to the editorship in 1852 and the proprietorship in 1876. He suggested the formation of the Primrose League, 1883, and was Conservative M.P. for S. Kensington, 1885-95. Knighted, 1880, he was created a baronet in 1887, and raised to the peerage as Baron Glenesk, 1895, when he handed over the control of the *Morning Post* to his son Oliver (d. 1905). By his death, Nov. 24, 1908, the title became extinct.

**Glenfinnan**. Glen and hamlet of Inverness-shire, Scotland. The hamlet stands at the head of Loch Shiel, 18 m. W. of Fort William. A monument, erected in 1815, marks the spot where Prince Charles Edward unfurled his banner in 1745.

**Glangariff**. Village and pleasure resort of co. Cork, Irish Republic, on Glangariff Harbour, an arm of Bantry Bay, 11 m. N.W. of Bantry. It is a noted beauty spot with almost tropical vegetation.

**Glegarry**. Glen of Inverness-shire, Scotland. It is formed by the Garry, and lies between lochs Quoich and Garry. It was the home of the Macdonalds, and gives its name to the Highland cap worn by kilted and other Scottish regiments.

This must not be confused with Glen Garry in Perthshire, part of the main road A9 between Perth and Inverness and traversed by a main railway line.

**Glen Innes**. Chief town in the rich New England plateau of New South Wales, in Gough co. It is 423 m. N. of Sydney by rly., on the

main line to Queensland. It is the chief tin-mining centre of the state, and bismuth, wolfram, and molybdenite are also found. Pop. 5,352.

**Glenlivet** OR **GLENLIVAT**. Valley of Banffshire, Scotland. It is the glen of the little river Livet, a tributary of the Avon, and is chiefly celebrated for its whisky. It is also the name of a parish, 6 m. S.E. of Ballindalloch.

#### **Glen Lyon.**

Longest of the Scottish glens. In Perthshire, it extends some 30 m. from Invermeran in the W. to a point near Aberfeldy in the E. The river Lyon, a tributary of the Tay, is narrow and rocky and the mountain prospect severe. This was the scene of a clan fight between Stewarts and Macgregors; Campbell of Glen Lyon organized the massacre of Glencoe (q.v.).

**Glenmore**. Valley of Inverness-shire, Scotland. About 60 m. long, it extends from the Moray Firth to the head of Loch Linnhe, i.e. right across the country. It is thus called also the Great Glen of Scotland. In it are the Caledonian Canal and lochs Ness, Dochfour, Oich, and Lochy. Other glens of this name include one in Perthshire.

**Glen Moriston**. See Moriston river.

**Glenrothes**. New town of Fife-shire, Scotland, created in 1948 to house miners working in the Rothes colliery (opened 1957) and their families. It lies 7 m. N. of Kirkcaldy, on both banks of the Leven, between the existing burghs

of Leslie and Markinch, and was intended to have a pop. of 32,000. (In 1957, the pop. was 8,433.) The town took in existing paper mills, and land was set aside for other industrial development besides the colliery.



Glenroy, looking across the glen to the three parallel roads or terraces

**Glenroy**. Valley of Inverness-shire, Scotland. About 14 m. long, running N. from Glen Spean, it is remarkable for three parallel roads which extend in terraces on both sides of the glen. They are generally thought to be the margins of lakes formed during the glacial period by the melting of the ice which filled the tributary valleys. The river Roy traverses the glen.

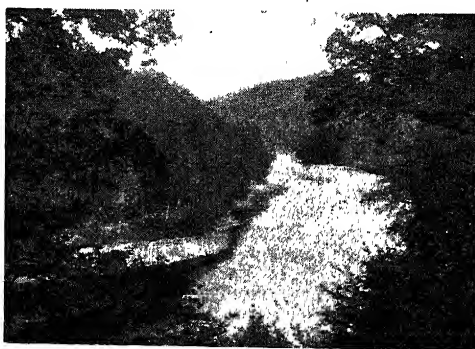
**Glens Falls**. City of New York, U.S.A., in Warren co. On the left bank of the Hudson, where it unites with the Champlain Canal, it is 55 m. N. of Troy, and is served by rly. and an airport. In the neighbourhood are limestone and marble quarries, and brick and cement works, and the city has plants producing pulp, newsprint, wallpaper, boxes, lace, toys, and pigments. It is named after falls on the Hudson river. Settled in 1763, Glens Falls, a village in 1837, became a city in 1908. This "dark and bloody ground" of Fenimore

Cooper saw fighting in the 18th cent. wars. Pop. (1950) 19,610.

**Glenshee**. A valley of Perthshire, Scotland. It is the valley of the Shee Water, which joins the Arde at Bridge of Cally; length 13 m. From the Spittal of Glenshee runs the highest motor road in the U.K. (2,199 ft.) over the Cairnwell to Braemar.



Glengarry bonnet



Glen Garry, Inverness-shire. View of the glen at the mouth of the river

**Glenshiel.** Valley of Ross and Cromarty, Scotland. Its length is about 10 m. from Loch Duich, E.S.E. to Clunie Bridge, and its average breadth is 4 m. It was formerly part of the Seaforth country, and in 1719, during the small Jacobite rising, there was a fight in the pass between the Sea-forths and the English. This place inspired Dr. Johnson with the idea of writing his *Journey to the Western Isles*. Glenshiel is also the name of a parish, which includes Letterfearn.

**Gientilt.** Valley of Perthshire. It runs for about 15 m. S.W. from the border of Aberdeenshire to Blair Atholl, being straight and of uniform steepness. The Tilt runs through it, hence its name. On both sides are peaks of the Grampians over 3,500 ft. high.

**Glider.** A heavier-than-air aircraft without an engine; the term usually embraces the sailplane,

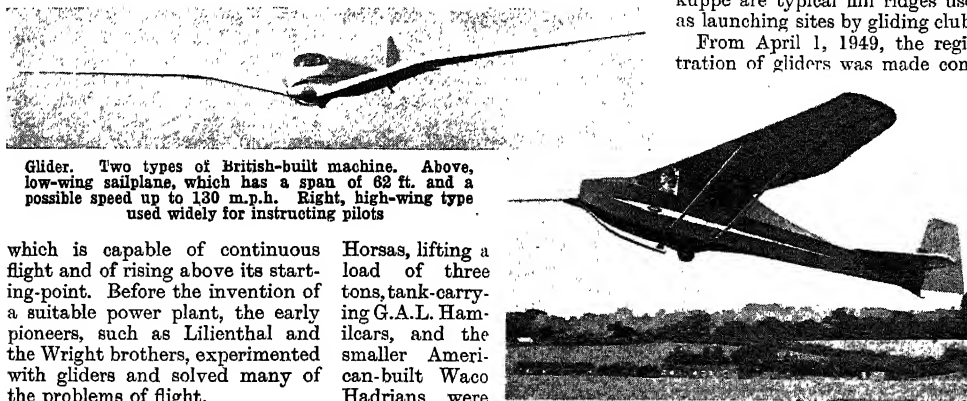
The Germans first exploited the aircraft towed glider—then a surprise in military tactics—in the invasion of the Low Countries in May, 1940; they used it again in Crete (see Crete in the Second Great War), and during the N. Africa campaigns. These gliders which were towed singly or in pairs, threes, or in line behind a Junkers transport (itself a troop-carrier), were simply, almost crudely, constructed of wood. They carried ten or so fully-armed shock troops, and were usually regarded as "expendable."

The glider and its tug were easy targets for fighter aircraft unless the force using them had superiority in the air. When the Allies invaded Europe on June 6, 1944, they had complete air superiority, and a huge armada of gliders formed, with the airborne parachutists, the spearhead of the liberating forces. British Airspeed

power of manoeuvre; the sailplane is often a masterpiece of engineering capable of taking advantage of "thermals," cloud formations, or other up-currents, and thus of soaring for remarkable distances. A well-built sailplane, which has a best gliding angle of about 1 in 25, has a finely tapered wing of great span, and a thin fuselage approaching a perfect streamlined form. Most gliders have a single skid as a landing gear, the larger transport gliders also taking off with a wheeled undercarriage which can be discarded in flight.

There are several methods of launching: by release from a rubber-cord catapult, by car tow, by high-speed winch, by utilising rocket propulsion, or from an aeroplane which has towed the glider into the air. Dunstable Downs, Long Mynd in Shropshire, and, in Germany, the Wasserkuppe are typical hill ridges used as launching sites by gliding clubs.

From April 1, 1949, the registration of gliders was made com-



Glider. Two types of British-built machine. Above, low-wing sailplane, which has a span of 62 ft. and a possible speed up to 130 m.p.h. Right, high-wing type used widely for instructing pilots

which is capable of continuous flight and of rising above its starting-point. Before the invention of a suitable power plant, the early pioneers, such as Lilienthal and the Wright brothers, experimented with gliders and solved many of the problems of flight.

The glider later suffered an eclipse, until the period between the First and Second Great Wars, when the sport of gliding was developed, especially in Germany (where the training of a military air force was then forbidden). High-performance sailplanes of German design were introduced into other countries, and the gliding clubs of Great Britain were largely equipped with original or adapted German craft.

Many new uses were found for engineless aircraft during the Second Great War. Pre-service training of potential pilots on primary gliders was a feature of several air forces; the Air Training Corps (*q.v.*) use gliders as an introduction to the R.A.F. Research with scale models provided data for wing sections, etc.; the troop-carrying glider, towed singly or in series behind a powered aircraft, was also developed.

Horsas, lifting a load of three tons, tank-carrying G.A.L. Hamilcars, and the smaller American-built Waco Hadrians were used successfully. The battle of Arnhem (*q.v.*), the crossing of the Rhine, in which over 1,300 gliders were towed to the battlefield, and the second Chindit expedition in Burma were other outstanding Allied glider-borne actions. (See also Airborne Forces; D-Day; Europe, Western: Its Liberation; Glider Pilot Regiment.)

After the war enthusiasts again took up gliding as a sport, in Britain under the British Gliding Association (offices, Londonderry House, Park Lane, London, W.1). Gliding equipment—some of it still of German origin—fell into four distinct classes: primary gliders, secondary gliders, two-seat gliders, and sailplanes. The primary is an open-framework training craft to accustom the pupil to the sensations of gliding flight, and to the use of the controls; the secondary is of better airflow design, and gives the pilot more

pulsory and certificates of airworthiness issued by the ministry of civil aviation. The Royal Aero Club grants to pilots certificates of proficiency in six classes: A, for which a flight of 30 secs. duration must be supported by proof of previous experience, etc.; B; C; and Silver, Gold, and Diamond C badges. Separate flights of 500 km. distance and 5,000 metres alt. qualify for the last.

Noteworthy records include: (distance) Miss O. Klepikova (U.S.S.R.), Moscow to Stalingrad, 465 m. in a straight line, July, 1939; (duration) G. Marchand (France), 40 hrs. 51 mins., March, 1949; (altitude) J. Robinson (U.S.A.), 33,497 ft., July, 1949. In Gt. Britain P. A. Wills in a German-designed sailplane, Weihe, flew from Hatfield to near Falmouth, 232 m., May, 1949; and above Long Mynd (Shropshire)



reached 15,247 ft., June, 1946. *Consult* Sailplanes: Their Design. Construction and Pilotage, C. H. Latimer-Needham, 1939; Flight Without Power, L. B. Barringer, 1942; Soaring Flight, T. Horsley, 1944; Gliding and Advanced Soaring, A. C. Douglas, 1947.

**Glider Bomb.** Radio-controlled bomb introduced by the Germans in 1943. It was a rocket-assisted glider with a war head of high-explosive. Carried under the fuselage of a Heinkel 177 and released from a great height, the bombs were guided to their target by radio-control from the parent aircraft. The glider bomb was used mainly against shipping; on Sept. 9, 1943, one sank the battleship *Roma* while it was on its way with the rest of the Italian fleet to surrender at Malta. *See* Bomb.

**Glider Pilot Regiment.** British army unit formed in 1942, disbanded in 1950, except for one



Glider Pilot  
Regiment badge

squadron. It consisted of volunteers selected from the army, and provided pilots and co-pilots for the gliders of an airborne force. Members were trained not only to fly gliders but also as assault infantry; after the gliders landed and discharged their troops the pilots acted as section-leaders. Each glider carried a section.

Glider pilots were trained by R.A.F. instructors, first learning to fly light-powered aircraft, then graduating to gliders. Training was continued at R.A.F. conversion units, where the pilots learned to fly service gliders.

The Glider Pilot regiment served in N. Africa, Sicily, Italy, and N.W. Europe. It suffered such heavy casualties at the battle of Arnhem (*q.v.*) that more than 1,000 R.A.F. pilots had to be drafted into its ranks to bring it up to strength for the Rhine crossing. A memorial window in Salisbury cathedral to 551 officers and men of the regt. was unveiled in 1950. In 1957 the Glider Pilot squadron was absorbed into the newly-formed Army Air Corps.

**Glinka, MICHAEL IVANOVITCH** (1803-57). A Russian composer. Born at Novospasskoi, Smolensk, June 2, 1803, he grew up in the country under the influence of folk music. He took lessons from Field in St. Petersburg, met Donizetti and Bellini in Italy, and studied composition in Berlin, returning to Russia in 1834. His opera *A Life for the Tsar*, was an immediate success in 1836. This

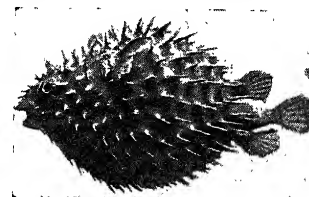
was followed by Russlan and Ludmilla, 1842, a work based on Pushkin's poem—musically superior but less popular. These operas, nationalist in spirit, are regarded as bringing to birth the school of Russian music. Glinka also wrote songs and pieces for the pianoforte. He died in Berlin, Feb. 15, 1857.

**Gliwice.** Polish form of Gleiwitz (*q.v.*), city of Upper Silesia.

**Globe** (Lat. *globus*). Spherical body, the whole of the surface of which is equidistant from the centre. The word is used in the singular to signify the earth. A sphere on the surface of which is drawn a map or representation of the earth or heavens is termed a terrestrial or celestial globe respectively. *See* Earth.

**Globe Amaranth** (*Gomphrena globosa*). Annual herb of the family Amaranaceae. A native of India, it has downy, opposite, oblong leaves. The flower-heads are globular, about 1 in. across and dark red.

**Globe Artichoke.** Perennial plant supposed to be a cultivated variety of the cardoon (*q.v.*).



Globe Fish. The lesser spotted variety with distended body

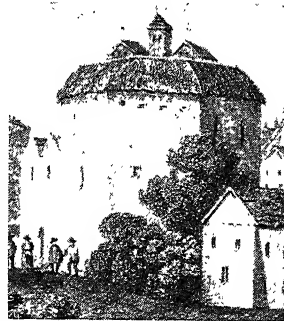
**Globe Fish** (*Chilomycterus antennatus*). Marine fish of the Tetrodontidae family. They are found in the tropic seas, and have the power of distending their bodies with air till they assume a more or less globular appearance. At other times they have the usual shape of a round-bodied fish. The largest species are about 2 ft. in length, and most are beautifully coloured.



Globe-flower. Leaves and flowers of this European herb

**Globe-flower** (*Trollius europaeus*). Perennial herb of the family Ranunculaceae. It is a native of Europe. The leaves are round in general outline, but divided into

five toothed lobes. The fine yellow flowers are globular, and their rich appearance is due to the numerous sepals, which are petal-like, while the true petals are small and narrow. The plant favours moist situations on high ground, and in the Scottish highlands is known as the luckengowan.



Globe Theatre, the old London playhouse associated with Shakespeare  
From an engraving c. 1612

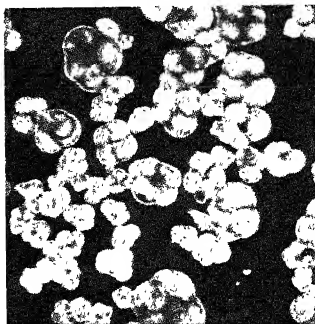
**Globe Theatre, THE.** Famous London playhouse, built on the Bankside, Southwark, in 1599, by the Burbages, Shakespeare, and four other actors. A circular building—the “wooden O” referred to in *King Henry the Fifth*—it held 1,200 spectators, and was partly open to the sky. Shakespeare acted and had shares in this theatre. It was destroyed by fire, June 29, 1613. Its successor opened June 30, 1614, lasted until April 15, 1644. It has been conclusively shown that the playhouse of Shakespeare's time was on the S. side of Park Street, Southwark, and the position of the frontage has been located to within a foot. A reconstruction was made for the film of *Henry V* in 1944. (*See* Bankside; The Globe Playhouse, J. Adams, 1943).

The third London playhouse of this name stood in Newcastle St., Strand, 1868-1902; here ran Charley's Aunt, 1893, and The Gay Lord Quex, 1899. Hicks's Theatre (built by Seymour Hicks), opened in Shaftesbury Avenue, Dec. 27, 1906, and renamed The Globe in 1909, became a leading West End playhouse. Its many successful comedies included The Glad Eye, 1912; French Leave, 1920; Our Betters, 1923; The Truth Game, 1928; Call it a Day, 1935; Robert's Wife, 1937; While the Sun Shines, 1943.

**Globe-thistle** (*Echinops*). Genus of biennial and perennial herbs. Of the family Compositae, they are natives of Europe and W. Asia. Their long, strongly lobed and

spiny leaves give them a resemblance to thistles. The flowerheads are gathered into large globular masses, each standing on a long stalk. The flowers are white or blue. The best known species is the S. European *E. ritro*.

**Globigerina.** Genus of Foraminifera. They are minute protozoa, mainly marine, which secrete shells. In the perforate group these shells are hard and glossy and are pierced by a vast number of little holes, through which the body protoplasm flows out in thread-like streams, called pseudopodia, for the purposes of loco-



Globigerina. Minute foraminiferous protozoa in globigerina ooze

motion and for seizing food. Globigerina abound in the sea, where their shells falling to the bottom form the globigerina ooze which constitutes such a considerable part of the bed of the ocean. See Foraminifera.

**Globularia.** A small genus of perennial herbs and shrubs, of the family Globulariaceae. Natives of the Mediterranean region, they have leathery, lance-shaped leaves, and numerous small flowers gathered into flattish heads. *G. vulgaris* and *G. nudicaulis*, with blue flowers, are frequently grown in gardens, and *G. alypum*, a shrubby species, in the greenhouse. They are sometimes known as ball-flowers.

**Globulins.** Class of protein substances which occur in both the plant



Globe-thistle. Leaves and flowerheads of the Echinops

**Glochidium.** Name given to the larval stage of the fresh-water mussel (*Anodonta cygnaea*) in the belief that it was a distinct species parasitic upon *Anodonta*. This mussel retains its eggs until they hatch, and the glochidia which result from them are found at first attached to the gills of their parent. They are cast out in the outgoing current of water from the gills of the parent, and attach themselves to the fins of sticklebacks and other fishes, and are thus distributed to other parts of the pond or stream. The shell develops, and the young mussels then drop to the bottom.

**Glockenspiel** (Ger., play of bells). Musical instrument, consisting of a series of tuned steel bars played upon either with two hammers or with a pianoforte keyboard. Formerly a row of bells was employed, hence the name. A notable use of the glockenspiel was by Wagner in the scores of *Die Meistersinger* and the *Ring cycle*.

**Glockner, GROSS.** Twin-peaked mountain of the Noric Alps, Austria. It lies between Tirol, Salzburg, and Carinthia, and is the loftiest summit of the Hohe-Tauern range. Its two peaks are named Grossglockner (12,455 ft.) and Kleinglockner (12,350 ft.). The former height was ascended for the first time in 1800 by Prince Salm-Reifferscheid. The Pasterze glacier is fed by the Glockner

snows. In 1935 the Gross Glockner motor road was opened. This connects N. Austria with Carinthia and Tirol, being 22 m. long and rising to 8,100 ft.

**Glogau** (Pol. Glogow). A town and former fortress of Silesia. Lying on the left bank of the Oder, 60 m. N.W. of Breslau, it is a rly.



Globularia alypum, a shrubby greenhouse species

and animal kingdoms. Insoluble in water, they dissolve in dilute neutral salt solutions. Globulins in solution are precipitated by adding ammonium sulphate to half saturation; on heating they coagulate. They include such proteins as myosin from muscle; fibrinogen from blood; and edestin from hemp.

junction and was a district capital and garrison town of Germany. From c. 1250, when it received German urban privileges, it was the bone of contention between rival princes. Remarkable buildings were a 12th century cathedral, churches of the 14th and 18th centuries, a palace (later town hall), theatre, and college all of the 18th century. It had a famous printing plant, clock, hat and metal works, sugar and starch factories, and shipyards. As a river port it had more than 250,000 tons turnover per year. Glogau was taken by Marshal Koniev's 1st Ukrainian army, April 1, 1945, and its German population (28,229) was expelled after it came under Polish administration in 1945.

**Glommen.** River of Norway, the principal stream of the country. It rises in the Dovrefeld at an alt. of 2,338 ft., issuing from Lake Aursund. Flowing in a generally S. direction for 350 m., it falls into the Skager Rak at Frederikstad. Timber from the Osterdal region, the richest wood district in Norway, is floated down stream to Frederikstad. The drainage area of its basin is 15,925 sq. m., and its largest tributary is the Vorma.

**Gloriana.** Titular character of Spenser's allegorical poem, *The Faerie Queene*. Introduced in canto i, 3, as "That greatest Glorious Queene of Faeryland," she personifies both Glory and Queen Elizabeth I, to whom the work was dedicated and who also figures in it as Belpheobe.

**Gloriosa.** A small genus of bulbous herbs of the family Liliaceae. Natives of tropical Asia and Africa, their branching stems bear lance-shaped leaves in pairs or whorls. These leaves have slender extended tips which act as tendrils, enabling the plants to climb. The rich orange and red flowers are reversed, their six undulated segments turning upwards, whilst the stamens and pistils spread out below.

**Glorious.** A British aircraft carrier of the Second Great War, sunk in action with German battleships Scharnhorst and Gneisenau on June 8, 1940, while covering the evacuation of Norway by British troops. Built in 1915 as a shallow draught cruiser to operate in the Baltic, and converted into a carrier in 1930 at a cost of £2,025,000, Glorious displaced 22,500 tons on a length of 786 ft., and had a speed of 30.5 knots. She carried 48 aircraft, sixteen 4.7-in. guns, and a number of smaller weapons.

**Glory** or BROCKEN SPECTRE. Name given to the series of coloured rings sometimes seen to be surrounding the shadow, on mist or cloud, of the observer. This phenomenon is quite common in hilly country, but is associated particularly with the Brocken (q.v.), Saxony.

**Gloss** (Lat. [from Gr. *glossa*, tongue], obscure word). Note or remark in the margin of a book or between the lines, to explain words likely to be of doubtful meaning to the reader: employed by copyists of old MSS. A collection of glosses forms a glossary, which is usually placed at the end of a book.

**Glossina**. This genus of flies, which transmit the parasites that cause sleeping sickness, is described in this work as Tsetse Fly.

**Glossitis** (Gr. *glōssa*, tongue). Inflammation of the tongue. Acute glossitis may arise from injuries, or from the bites or stings of insects; it is occasionally seen in acute fevers. The tongue becomes swollen and painful and there is interference with speech, swallowing, and respiration. Chronic glossitis is associated with various forms of anaemia, with pellagra, and with syphilis. Treatment depends upon the cause. See Tongue.

**Glossodia** (Gr. *glōssa*, tongue). Small genus of terrestrial orchids. Natives of Australia, they have egg-shaped tuberous roots and a solitary lance-shaped or oblong leaf. The flowering stem does not exceed 1 ft. in height, bearing one, two, or three blue or purple flowers, sometimes speckled with white. These are of more regular form than in most orchids. At the base of the lip is a long, tongue-like appendage which has suggested the name of the genus.

**Glossop**. Borough and market town of Derbyshire, England. It is 13 m. E. of Manchester, and is served by electrified rly. It makes cotton and other textiles. There are also dyeworks, bleachworks, paper mills, calico printing, and food canning. The chief church is All Saints, and there are three fine R.C. churches. Hadfield is part of the borough, much of which is built on land belonging to the Howards of Glossop. Glossop Hall is a fine building in the style of a French château. Glossop is in the Peak district national park, and the co. constituency of High Peak, and near it is Longendale with the Etherow flowing through. It was made a borough in 1866. Market days, Fri. and Sat. Pop. (1951) 18,014.

**Glosso-pharyngeal Nerve**. Ninth cranial nerve. It is the nerve of sensation to the upper part of the throat and tonsils; of taste to the back and posterior two-thirds of the side of the tongue; and of motion to the stylo-pharyngeal muscle; and middle constrictor of the pharynx.

**Glottis** (Gr.). Chink between the true vocal cords. It alters in size and shape with the degree of tenseness in the cords which also determines the pitch of the note emitted in speaking or singing. Spasm of the glottis occurs in whooping cough, croup, and sometimes in tetanus.

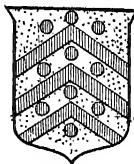
**Gloucester**. City, county bor., port, and co. town of Gloucestershire, England; also co. of itself. It stands on the left bank of the Severn. 114 m. W. by N. of London; it is served by two railways and by the Berkeley Canal (16½ m.), which connects the docks with those at Sharpness in the Severn estuary.

An abbey was established here in 681, and in 1022 a Benedictine monastery was founded, the church of which, following the dissolution of the monasteries by Henry VIII, became the cathedral in 1541, when Gloucester was constituted a separate see. Substantially Norman, the cathedral is a magnificent edifice, and contains

unique fan tracery, the canopied shrine of Edward II, the shrine of Osric, king of Northumbria, other fine monuments, and beautiful stained glass. Other buildings include the 12th century church of S. Mary de Crypt, the episcopal palace, the guildhall, the prison, the King's School, and other educational institutions. The centre of the city is the Cross, the intersection of four main streets known as Eastgate, Northgate, Westgate, and Southgate.

The city was once a walled town, but very little evidence of this remains. There are memorials to the martyr Hooper, who was bishop of Gloucester, and Raikes, the founder of Sunday schools, and several public parks. Gloucester has engineering and other works for the manufacture of aircraft, railway carriages, engines, agricultural implements, machinery, oil and feeding cake, chemicals and essences, matches, carpets, rugs, and in war-time munitions. It gives its name to a bor. constituency. Market days, Mon. and Sat. Pop. (1951) 67,280.

Gloucester is one of the most historic of English cities. Com-



Gloucester arms



Gloucester. The cathedral from the south-east. In the foreground is the 15th century Lady Chapel

Frith

manding the passage of the Severn, it was probably the British Caer Glow, and the Roman *Glewum*. In Anglo-Saxon times it may have been a fortified place and was occasionally the residence of kings. It was one of the three places at which William the Conqueror held parliaments; and the compilation of Domesday Book in 1086 was ordained by an edict issued here. In the 12th century it was a centre of commerce.

**Gloucester.** A city of Massachusetts, U.S.A., in Essex co. On the S. of Cape Ann peninsula, facing the N. side of Massachusetts Bay, it lies 32 m. N.E. of Boston by rly. A port of entry and a popular summer resort, it has one of the finest harbours on the coast, and is the cod, halibut, and mackerel fishing centre of the U.S.A.

Its fishing fleets, manned largely by men of Portuguese, Italian, and Scandinavian descent, range the Atlantic as far as Iceland and Greenland. Their hardy and adventurous lives have provided literary material, e.g. in Kipling's *Captains Courageous*. A bronze statue was set up in 1923 to commemorate the thousands of fishermen who have lost their lives at sea. Norman's Woe, 2 m. from Gloucester, is the sunken rock of Longfellow's *The Wreck of the Hesperus*. Pop. (1950) 25,167.

**Gloucester, EARL AND DUKE OF.** English titles. Like other counties, Gloucester had its earls in Norman times, one of these being Robert, a natural son of Henry I. The great family of Clare secured the title about 1218, and retained it until Earl Gilbert was killed at Bannockburn in 1314. In 1385 Thomas of Woodstock, a younger son of Edward III, was made duke of Gloucester, and after he had forfeited the title in 1397 it was held by Henry IV's son Humphrey, and by him who became Richard III. Later dukes of Gloucester were Henry, a son of Charles I; William (d. 1700), only child of Queen Anne to survive infancy; and George III's brother, William Henry, created duke in 1764. He died in 1805, when his only son, William Frederick, known as Silly Billy, became duke. He married his cousin, Mary, daughter of George III, and when he died, childless, in 1834, the title again became extinct. It was revived in 1928 for Henry, third son of George V and a younger brother of George VI.

**Gloucester, HENRY WILLIAM FREDERICK ALBERT, DUKE OF** (b. 1900). British prince. Third son of King George V, he was born at

York Cottage, Sandringham, March 31, 1900. His health at first being delicate, he attended a



H.R.H. the Duke of Gloucester, brother of King George VI, with the Duchess of Gloucester

private school at Broadstairs, but later went to Eton, adopted a military career, and was commissioned in the 10th Royal Hussars. In 1921 he was created K.G., and in 1925 became a privy councillor and was one of four counsellors of state deputed to act for the king when he was abroad.

A duke from 1928, he went to Japan to invest the emperor with the Order of the Garter, 1929, and in 1930 was present at the coronation of the emperor of Abyssinia. His marriage to Lady Alice Montagu-Douglas-Scott (b. Dec. 25, 1901), daughter of the 7th duke of Buccleuch, took place on Nov. 6, 1935, in the private chapel of Buckingham Palace. In 1937 the duke was promoted major-general, but soon relinquished his army career to assist his brother, King George VI, by undertaking official engagements. He was appointed A.D.C. to the King and colonel-in-chief of several regiments.

At the outbreak of the Second Great War, the duke became chief liaison officer to the B.E.F. in France, and on Aug. 12, 1940, was made chief liaison officer, G.H.Q., Home Forces. In 1942 he made a tour of British forces in the Middle East and India. On Nov. 15, 1943, it was announced that at the request of the Commonwealth government the duke had been nominated first royal governor-general of Australia; but as senior regent he was unable to leave Great Britain to take up his appointment until 1944, when Princess Elizabeth had come of age. His governorship was limited to two years, and he returned to Great Britain in Jan., 1947, so as to act as counsellor of state during the King's absence in S. Africa.

The sons of the duke and duchess of Gloucester were Prince William Henry Andrew Frederick, born Dec. 18, 1941; Prince Richard Alexander Walter George, born Aug. 26, 1944.

**Gloucester, HUMPHREY, DUKE OF** (1391-1447). English prince, youngest son of Henry IV and Mary de Bohun. Created duke by his brother Henry V, he was wounded at Agincourt, captured Cherbourg, and fought at Rouen. He acted as regent during the king's absence in France, 1420-21, and was protector of the realm with limited powers during the minority of Henry VI. Humphrey's impulsiveness led to quarrels with the Beaufort faction, and his opposition to Henry's French marriage brought the enmity of Suffolk. Under arrest on a charge of treason, he died at Bury St. Edmunds, Feb. 23, 1447, and was buried at St. Albans.

Humphrey was not unlike a prince of the Italian Renaissance. He patronised men of learning and gave Oxford

University its first library (nucleus of the Bodleian). The common people loved the "good duke" and Shakespeare follows tradition in King Henry the Sixth. A promenade in St. Paul's cathedral was long known as Duke Humphrey's Walk, from the erroneous notion that it contained his tomb; and the phrase "dinner with Duke Humphrey" (i.e. no dinner) was an allusion to the beggars who loitered there. *Constitution Life*, K. H. Vickers, 1907.



Humphrey Duke of Gloucester From a portrait

**Gloucester, THOMAS OF WOODSTOCK, DUKE OF** (1355-97). English prince. The youngest son of Edward III was born at Woodstock, Jan. 7, 1355. A rich wife was found for him in the heiress of the Bohuns, and he was made constable of England and earl of Buckingham. Thomas's public life almost covered the reign of his nephew, Richard II. Having fought in France, he received a dukedom in 1385 and was



Thomas of Woodstock, Duke of Gloucester From a portrait

the leader of those who put a check upon the arbitrary deeds of Richard in 1386. As leader of the lords appellants in 1388, he crushed his enemies ruthlessly, and for a short time was the real ruler of England.

Richard regained authority in 1389, but kept on good terms with his uncle until 1396. Differences arising between them, Richard himself arrested Gloucester at Pleshey, his Essex castle, in July, 1397, and a little later his end came: most probably he was put to death secretly at Calais in Sept. His son was not allowed to inherit his titles or estates.

**Gloucester Cheese.** Hard whole-milk cheese, made between autumn and Christmas, and of a rich red colour. It is the ideal substitute for the original Welsh cheese of a rarebit. The term Double Gloucester refers to its size. A foreign expert has dismissed this cheese as "similar to Cheddar," but another ranks it "for richness and delicacy of flavour with the great blue cheeses."

**Gloucestershire.** Western co. of England. Very irregular in

shape, it falls into three parts. In the W., lying between the Severn and the Wye, is the Forest of Dean; in the centre is the Severn valley; in the E., the Cotswolds. Its greatest length, S.W. to N.E., is 64 m.; area 1,257 sq. m. (1,208 sq. m. excluding the co. bors. of Bristol and Gloucester). The chief rivers are the Severn, which flows right through Glos and forms the estuary making it a maritime county; Wye, Upper and Lower Avon, and Thames, which rises here. Smaller streams are the Frome, Coln, Leach, Leadon, and Windrush. The chief range of hills is the Cotswolds, famous rather for the quiet beauty of their stone villages than for their height, although some points exceed 1,000 ft.

Gloucestershire is mainly an agricultural county: the Severn valley is noted for its rich pasture land; wheat is grown in the Cotswolds. Cheese is made, apples and pears are grown for making cider and perry. Sheep are plentiful on the Cotswolds. Industry is concentrated round Gloucester, Cheltenham, and the Stroud valley;

coal is mined in the Forest of Dean and on the fringe of Bristol. There is a nuclear power station at Berkeley. Gloucester is the county town, but Bristol is much the largest. Cirencester and Tewkesbury are noted for their architectural and historical associations. Cheltenham, as well as being a centre of industry, is a health resort and education centre. A feature of the county is the picturesque market towns, e.g. Minchinhampton, Northleach, Nailsworth, Tetbury, Chipping Campden, Winchcomb.

The co. sends four members to parliament, and its boroughs another eight. It is a hunting county. Its cricketers have included the Grace brothers, G. L. Jessop, and W. R. Hammond. It is in the Oxford circuit and in the dioceses of Gloucester and Bristol. Pop. (1951) 939,433.

**LITERARY ASSOCIATIONS.** Robert of Gloucester was a 13th-century rhyming chronicler. Another chronicler of a century later was Richard of Cirencester. William Tyndale, first English translator of the Bible, belonged to a Gloucestershire family. A bishop of Bristol was Joseph Butler, author of *The Analogy of Religion*. William Warburton, critic and friend of Pope, was bishop of Gloucester. Writers born at Bristol include Chatterton and Southey. John Keble was born at Fairford; Hannah More at Stapleton. Daniel and Samuel Lysons were born in Glos.

Cirencester House (formerly Oakley Park) was frequently visited by Swift and Pope. At Amberley, Dinah Maria Craik wrote *John Halifax, Gentleman*, scenes in which are based on life at Tewkesbury. Shakespeare lays scenes of Richard II and Henry IV, part 2, in Gloucestershire. Shelley, T. E. Brown, Newbolt, Drinkwater, and Flecker have used Gloucestershire as a background to their poetry.

**Gloucestershire Regiment.** A regiment of the British army raised in 1694 as the 28th Foot. It served under Marlborough at Ramillies in 1706 and was at Fontenoy in 1745. It went to America and the West Indies, and fought with distinction at Guadeloupe, 1759, Quebec, 1759, Martinique, 1762, and St. Lucia, 1778



Gloucestershire arms



Gloucestershire. Map of this West of England county, showing the head of the Severn estuary

At the battle of Alexandria in 1801 the regiment was attacked by Napoleon's Invincible Legion both front and rear, but, fighting back to back, defeated the enemy with heavy loss. To commemorate the victory it was permitted the unique distinction of wearing a badge at the back of the cap as well as on the front, which earned it the nickname of "The Fore and Afts." The regiment repeated its exploit in the First Great War when surrounded by Prussian guards at Ypres.



Gloucester Regiment badge

**Battle Honours of the Regiment**  
In the Peninsular War the 28th gained fourteen battle honours, distinguishing itself at Talavera and Salamanca, and fought at Waterloo. It served in the Sikh War and the Indian Mutiny, and in the Crimea fought at Alma, Inkerman, and Sevastopol.

In 1881 the 28th was amalgamated with the 61st Foot and given its present county title. The Gloucesters served throughout the Boer War, and were at the defence of Ladysmith and the relief of Kimberley. Twenty-four battalions were raised for service in the First Great War, and amongst the battle honours won were: Mons; Ypres, 1914, 1915, 1917; Somme, 1916, 1918; Lys; Selle; Vittorio Veneto; Doiran, 1917; Sari Bair; Bagdad.

Two battalions were with the B.E.F. in France in the Second Great War. The 2nd Battalion had been so hard pressed that only one officer and nine men were left to be taken off from Dunkirk. The 1st Gloucesters were in Rangoon at the outbreak of war and served throughout the Burma campaign; they were later joined by the 10th battalion. The 2nd Gloucesters helped to capture Havre in 1944, and were the first British troops to enter Arnheim, April 13, 1945. The 4th Gloucesters acted as a searchlight regiment during the Second Great War. The 1st battalion made a notable stand on the Imjin river, Korea, April, 1951. The regimental depot is at Gloucester.

**Glove.** Close-fitting garment covering the hand. Xenophon refers to their use by the Persians. They were familiar to the Romans, who, however, generally despised their use, and were worn by the Anglo-Saxons in the 7th century. In those days there was a separate division only for the thumb. A glove with two thumbs, so that it

may be used for either hand, is still worn in Iceland. In the 13th century gloves made of linen and reaching to the elbow began to be worn for ornament, as well as for warmth or protection.

Leather gauntlet gloves were used for hawking, and knights in full armour had gloves with metal entirely covering the back of the hand and overlapping the fingers. These were made flexible in the centre. Gloves were part of the imperial insignia in the Middle Ages, and are still worn ceremonially by the pope and the R.C. hierarchy. In the gorgeous dress of the 15th, 16th, and 17th centuries gloves, perfumed, jewelled, or richly embroidered on the back, and decorated with fringed gauntlets, made their appearance. Queen Elizabeth I was especially fond of these costly articles, and some of her gloves are still extant.

The three rows of stitchery seen on the back of modern gloves are said to be a survival of these embroidered backs, though it is more probable that formerly the stitching of the fingers was extended to make the hand look long and slim. Modern forms of gloves include rubber ones worn for anti-septic reasons by surgeons, and for protective purposes by electricians, etc., and padded gloves for boxing, cricket, fives, and other sports and games.

#### Symbolic Meanings of Gloves

Gloves have had their symbolic meanings. Thus it was the custom to wear gloves in the hat as the favour of a mistress, the memorial of a friend, and as a mark to be challenged by an enemy; and a glove was thrown down as a challenge to an enemy, who accepted battle by picking it up.

Gloves are believed to have been first made in England on a large scale by the monks of Bath. In the 14th century a guild of glovers came into existence in London, and the trade of making them was already a profitable calling. The prices of ordinary sheep-leather gloves were then fixed at 1½d. per pair, whilst the best gloves fetched 2d. a pair.

By 1190 the glove-makers of France had formed themselves into a company with S. Anne as their patron, while in Scotland the glove-makers of Perth were a chartered corporation in 1165. In England the glovers obtained a charter of their company in 1638.

In considering the glove trade, it is well to have a clear idea of the meaning of names applied to gloves of various qualities. The

name Cape, one of the first to be met with, was originally used to designate a glove from the Cape of Good Hope. The skin is large, heavy, and rather tight-grained. Latterly, however, the soft, pliable glove usually made from sheep and lamb skins tanned and dressed by the "nappa" method has become commercially known as Cape. What was once a name for a glove made from a single type of skin is now the designation of a glove made from leather of a particular tannage. The best types of these skins come from the district of Kazan and the Volga area in Russia. Others come from Spain, Turkey, Rumania, Bulgaria, Yugoslavia, and to a smaller extent from other sources. The skins with the finest grades of wool are normally inferior for glove-making to those with hairy, wiry wool.

#### Dressing and Colouring

Lamb glove and Cape glove, when advanced to the stage of tanning known as "in the white," are virtually identical, except that the skins that make Capes are heavier and larger. It is in the finishing and colouring processes that the distinction occurs. The dressing and colouring which complete the tannage of Capes is done by the "drum" or "dipped" process, and the skin is coloured all the way through; whereas leather for the so-called lamb glove has the colour "brushed" on the grain surface only, leaving the flesh side or the inside of the glove white. The nappa tannage is an alum process, and besides there is a chrome tannage which has the merit of being washable in water of any temperature up to boiling point.

After much experiment a tannage was perfected for the skin of the Arabian haired sheep, resulting in the production of the strong, soft, and velvet-like finished Mocha glove. The Mocha sheep is a distinct type, not a species resulting from cross-breeding between the Mocha goat and the woolled sheep, as is frequently supposed. No other glove passes through so many processes in tanning and dressing as the Mocha, and while the appearance of the finished leather somewhat resembles suède, it is in fact very different in character. Mocha is "friezed," not "suèded." The finished or outer side surface of the gloves is on the grain, not the flesh side of the leather. The friezing process removes the grain, leaving much of the strength of the outer skin. The name suède is applied to a glove of leather when subjected to the suèding process.





Glove. Processes in glove manufacture. 1. Stretching the skins in readiness for the puncher. 2. Punching the skins into shape. 3. The stitching room. 4. Finishing off and laying out the gloves on steam heated shapes

The chamois and the doeskin of commerce are both sheepskins, or parts of sheepskins, tanned and dressed as chamois or doeskins. Dealers and merchants in sheepskins find it advantageous to split the skins edgewise, thus providing two thinner skins. The upper part with the grain surface is termed a "skiver," and the lower a "flesher," and it is from these flesher sheepskins that the leathers known as chamois and doeskin are produced.

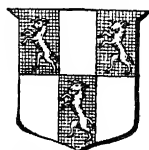
#### Process of Manufacture

All gloves are subjected practically to the same process. After they have been stamped out the sewing process is carried out by machines. The first machine invented for glove sewing was put on the market about 1875. In the quality and finish of the cloth from which gloves are made British makers have made rapid progress. The "sueded" cloth, a fabric so finished as to give it the velvety feel and appearance of sued leather, and the "Duplex" cloth, which is made by sticking together two single cloths by processes more or less secret, were before 1914 almost a German monopoly, but machinery was evolved which allowed of British products equal to any German fabrics. *Consult* Gloves Past and Present, W. M. Smith, 1917.

A. T. E. Binstead

**Glover, TERROT REAVELEY** (1869-1943). A British scholar. Born at Bristol, July 23, 1869, he was educated at its grammar school and S. John's College, Cambridge. Professor of Latin at Queen's university, Kingston, Ont., 1896-1901, he returned to Cambridge, where he became a leading personality at the university and was public orator, 1920-39. A fine interpreter of the classics both as writer and as lecturer, he wrote *Life and Letters in the 4th Century*, 1901; *Studies in Virgil*, 1904; *From Pericles to Philip*, 1917; *Democracy in the Ancient World*, 1927; *Greek Byways*, 1932; *The Ancient World*, 1935; *The Challenge of the Greeks*, 1942. He died May 26, 1943.

**Glovers' Company, THE.** London city livery company. First mentioned in 1349, incorporated with the Leather-sellers in 1502, it was separately incorporated by letters patent in 1638. The site of the old hall, in Beech Lane, E.C., is covered by warehouses. Offices: 116, Cannon St., E.C.4.



Glovers' Company arms

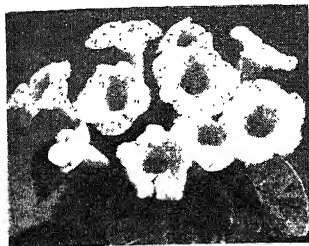
**Gloversville.** City of New York, U.S.A., in Fulton co. On the Erie Canal, 34 m. N.W. of

Albany, it is in the foothills of the Adirondacks, and is served by rly. and barge canal. Fulton co. is the chief centre of glove making in the U.S.A., the industry dating from 1760 when Perthshire settlers arrived. Gloversville also makes silk and knitted goods and wooden products. It became a city in 1890. Pop. (1950) 23,634.

**Glow-worm.** Name given to the female of the beetle *Lampyrus noctiluca*. It is common in many parts of Great Britain and throughout central and southern Europe. While the male possesses large elytra and has the usual appearance of a beetle, the female is wingless and grublike in form, resembling a larva rather than a perfect insect. The creature derives its name from the presence of luminous spots on the abdomen, which indicate its whereabouts to the male.

**Gloxinia.** Hot-house plants of the family Gesneriaceae. They are natives of Central Asia and India, and were introduced into Great Britain in 1739. They reach an average height of 1 ft. and have elongated, bell-shaped blossoms of every possible shade and colour. They may be raised from seed planted in March in an ordinary

greenhouse, or from the tubers potted up early in the year. Gloxinias need watering freely



Gloxinia. Foliage and flowers of *G. sinningia*

until they flower, but when the foliage withers, water should be gradually diminished in supply until the tubers are quite dry. There are about six species in cultivation; hybrids are innumerable.

**Glubb, SR JOHN BAGOT** (b. 1897). British soldier. Born April 16, 1897, and educated at Cheltenham and the R.M.A., Woolwich, he was commissioned in the Royal Engineers in 1915 and served in France, being three times wounded. In 1920 he went to Iraq. Transferred to Transjordan, 1930, Glubb in 1932 became desert control officer in the Arab Legion, which he commanded 1939 until summarily dismissed by King Hussein in 1956. Glubb Pasha was promoted brigadier in 1943 and made C.M.G. in 1946, K.C.B. 1956. He published *Story of the Arab Legion*, 1948.



Glubb Pasha, British soldier

1956. Glubb Pasha was promoted brigadier in 1943 and made C.M.G. in 1946, K.C.B. 1956. He published *Story of the Arab Legion*, 1948.

**Glucinum.** Variant name of the chemical element more usually called beryllium (*q.v.*).

**Gluck, CHRISTOPH WILLIBALD** von (1714-87). German composer. Born at Weidenwang, Bavaria, July 2, 1714, son of a gamekeeper, he studied music at Prague and later at Milan. After producing from 1741 a number of operas of the conventional type, he realized the need of drastic reforms and introduced these into his works. *Orfeo ed Euridice*, 1762, is a landmark in the history of opera, and shows his ideas of making the relation of the music to the poetry more harmonious, resembling that between the arrangement of light and shade in drawing.

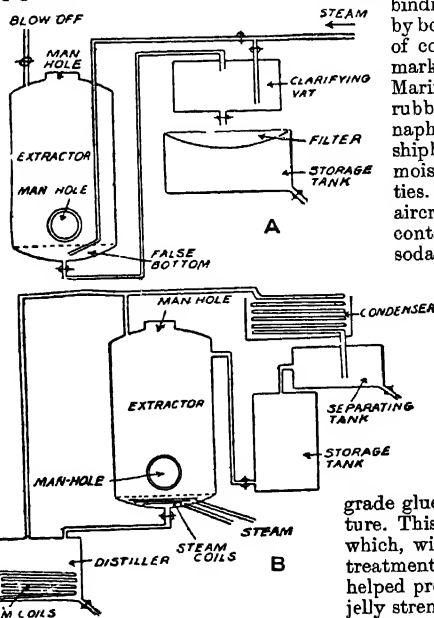
The more mature opera *Alceste* followed in 1767. *Iphigénie en*

*Aulide* (Paris, 1774) was the occasion of a struggle between two musical schools in which Gluck's party was victorious over the followers of Piccinni. His success was consolidated by *Armide*, 1777, and *Iphigénie en Tauride*, 1779. Gluck was at one time music master to Marie Antoinette. For long he resided in Vienna and received from the emperor the title of Ritter von. He died there, Nov. 15, 1787. A Life by M. Cooper appeared in 1935. *Pron.* Glook.



**Gluconic Acid** ( $C_6H_{12}O_7$ ). Colourless crystalline substance, soluble in water and alcohol, produced by bacterial, chemical, or electrochemical oxidation of glucose. The calcium salt is used in medicine to counter deficiency of this element in the blood.

**Glucose.** Carbohydrate of the monosaccharide class, belonging, with fructose and galactose, to the hexose group. The vegetable kingdom can synthesise glucose from carbon dioxide and water—a proceeding which depends on solar energy (photosynthesis) which is translated by chlorophyll (or allied pigments) into chemical energy.



Glue. A, plant for extracting and clarifying glue; B, plant for degreasing bones

Man does not synthesise hexose in this way: he depends on plant life to do it for him. The human liver can produce glucose from proteins or fats, but these have already been produced by plant or animal life. More complex carbohydrates taken in by the body are metabolised to the hexose level. The breakdown of glucose in the presence of phosphorus in the tissues gives the energy for every bodily action. The nervous system utilises glucose alone of all energy-giving substances. Stored in the liver, it is released into the blood, coma and death resulting if the proportion is sensibly varied. Glucose metabolism goes awry if the level of the B group of vitamins is lowered beyond a certain point. Glucose is the form of sugar present in the blood in diabetes and glycosuria.

**Glycosides.** Class of substances occurring in the vegetable kingdom, which yield glucose (dextrose) on fermentation or by the action of dilute acids. *See* Glycosides.

**Glue.** Impure form of gelatine. It is a by-product of industries dealing with skins, bones, and animal tissue, and arises by the action of steam on the insoluble protein matter found in such materials. Skin glue is stronger than bone glue, but both are used for wood working, abrasive paper, gummed paper, and in book-binding. Fish glue is prepared by boiling the skin and tissue of cod, etc., and is usually marketed as a viscous liquid. Marine glue is a solution of rubber and shellac in naphtha or benzene used in shipbuilding because of its moisture-resisting properties. Casein glue, used for aircraft work, is a powder containing casein, lime, and soda; its great advantage lies in the fact that it can be used at ordinary temperatures. Some synthetic glues made from resins set by heating, not by cooling as with animal glue.

During the First Great War there was a demand for high-grade glue in aeroplane manufacture. This led to systematic study, which, with careful selection and treatment of the raw material, helped production of glues of high jelly strength. The British Standards Institution published in 1927 agreed methods for testing glues, the methods being the result of

collaboration between chemists, manufacturers, and users.

Glutin is the main constituent of glue prepared from skins, and chondrin when bone tissue is used. Skins are washed, soaked in milk of lime, and neutralised before boiling with water; this leads to a purer glue of higher jelly strength. Bones, chiefly the head, ribs, and shoulder blades of cattle and horses, are thoroughly sorted, cracked in a suitable mill, and treated with benzol or a petroleum fraction for the extraction of bone fat. The cleansed bones are steam-heated in vertical boilers for the extraction of the glue and the latter after purification is dried to the familiar cake.

Glue is derived from substances containing large molecules, such as those in proteins, starch, resins, and rubber. By dispersal in water the molecules are partly broken down, and the dissolved units, being of graded molecular size, can penetrate into surfaces of various porosities. The liquor has a low surface tension but a high viscosity temperature coefficient. On cooling, the glue liquor sets to a jelly, which in turn loses water reversibly to form a solid tough film. The tensile strength of this film depends on the purity and degree of hydrolysis of the original protein from which the glue was derived, as also on the final moisture condition of the joint. Microscopic examination of a good glue joint shows a continuous film between the two wood surfaces and that this film penetrates into the pores, producing the desired adhesive effect.

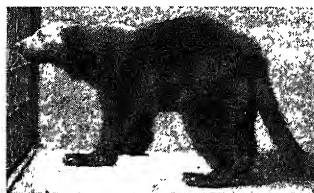
H. M. Langton, B.Sc., F.R.I.C.

**Glukhov.** A town of Ukraine S.S.R., in the region of Chernigov. It is 120 m. E. by N. of Chernigov town. There are rope and brick works, breweries, and distilleries. Glukhov was once the residence of the hetman of the Little Russian Cossacks. The centre of a Russian counter-attack in Sept., 1941, Glukhov was taken by the Germans in Oct. during their advance on Kursk. It remained in German hands until Aug. 30, 1943, when it was re-captured by the Russians in their first re-entry of the N. Ukraine.

**Gluteal Muscles.** Three muscles, *Gluteus maximus, medius, and minimus*, which form the fleshy mass of the buttock (Gr. *gloutos*, rump). Their principal action is to extend the thigh or straighten the body after stooping. They also help to move the thigh outwards and rotate the leg outwards.

**Gluten.** Tough, elastic substance, consisting principally of protein, obtained from wheat flour by washing it with water. The two principal ingredients of gluten are the proteins gliadin and glutenin, as a result of which wheaten flour forms dough. Gliadin, soft and sticky, is obtained from gluten by treatment with alcohol; glutenin, insoluble in water and alcohol, can be obtained from dough with dilute alkali. Bread and biscuits made from gluten are eaten by diabetics who must avoid starch.

**Glutton OR WOLVERINE** (*Gulo luscus*). Carnivorous mammal of the weasel group, found in the



Glutton or wolverine, a species of weasel  
W. S. Berridge, F.Z.S.

northern districts of Europe, Asia, and N. America. It does not now occur in Great Britain, but its fossil remains are not uncommon. It is nearly 3 ft. in length, has dark brown fur, and a short, bushy tail. Of heavy build, it walks with something of the action of a bear, is found in forests, is nocturnal in habit, and devours any animal it can catch. It is particularly expert in digging rabbits out of their burrows.

**Glycas, MICHAEL** (fl. 12th century). A Byzantine historian. Probably a native of Sicily or Corcyra, he was the author of a general history of the world from the earliest times down to 1118, the end of the reign of Alexius I Comnenus. The work is written in a simpler style than most of the Byzantine histories.

**Glycerine, GLYCERIN, OR GLYCEROL** [ $C_3H_5(OH)_3$ ]. Thick colourless liquid with a syrupy taste, obtained by the decomposition of fats and oils in the process of making soap and candles. It was discovered by Scheele in 1779 as a by-product in the manufacture of lead plaster. Chevreul and Braconnet in 1817 showed that glycerine is a component to the extent of 9 to 11 p.c. of all fats and oils. The discovery of nitroglycerine by Nobel in 1863 increased the demand for glycerine and caused it to be manufactured on a large scale.

Glycerine is produced to a small extent in the fermentation of sugar, but the chief sources are the waste products of the soap and candle maker. When fats and oils are saponified with a caustic alkali, the fatty acids combine with the soda or potash, and glycerine is formed as a by-product. This "sweet-water," as it is called, is afterwards purified and concentrated. The candle-maker requires only the harder portion of fats, and to obtain this heats the fats with lime or magnesia, either in open vessels or in an autoclave, glycerine being again obtained as the by-product.

Other methods of obtaining glycerine from fats are by the acid saponification process, Twitchell's process, and the use of a ferment obtained from castor oil seeds. The by-products are subsequently purified either by distilling the crude glycerine with superheated steam at ordinary pressure or in a vacuum apparatus. Colour is removed by treating the glycerine with animal charcoal and water by evaporation. Glycerine can be obtained by chlorinating the hydrocarbon propylene, a by-product in the cracking of petroleum, to form allyl chloride. This is combined with hypochlorous acid and the product, when hydrolysed, yields glycerine. Much distilled glycerine is used to make high explosives such as dynamite, blasting gelatine, and cordite. It is required to pass special tests before it can safely be used for the manufacture of explosives. The purest glycerine is employed for medicinal purposes. The substance is used in filling gas-meters and hydraulic jacks, for giving body to light wines, in liqueurs, and in the manufacture of copying inks, shoe polishes, printers' rollers, copying graphs, and toilet preparations.

**Glycocol, GLYCIN, OR AMINO-ACETIC ACID** ( $C_2H_5NO_2$ ). Discovered by Braconnet in 1820, and prepared by boiling glue with sulphuric acid or caustic potash. It can be made by mixing chloroacetic acid and ammonia solution, or by boiling hippuric acid with strong hydrochloric acid. It forms colourless crystals. Glycocol has a sweet taste, and its solution is coloured deep red by iron chloride and deep blue by copper salts.

**Glycogen.** Name given to the form in which glucose is stored in the body. It is a carbohydrate related to dextrin. First discovered (by Claude Bernard) in the liver, it was later found in small quantities

in other organs of the body. It is readily converted back into glucose by enzymes in the liver and muscles. During exertion the glycogen in the muscles is rapidly consumed; it is replenished during rest; consequently the concentration varies (0.1 to 1 p.c.). Glycogenolysis is the destruction of glycogen in animal tissues, including the final splitting and oxidation of glucose. See Glucose.

**Glycol** or **ETHYLENE GLYCOL** ( $C_2H_6O_2$ ). Colourless liquid with a sweet taste, discovered by Wurtz in 1859. It can be prepared by boiling potassium carbonate with ethylene bromide and water, the product being distilled and fractionated. Made from the ethylene of natural gas, glycol is used as an anti-freeze solution in motor-car radiators, and as a cooling agent in aircraft engines. As it has a higher boiling point than water, a smaller radiator scoop can be fitted. The Rolls-Royce Merlin was the first engine to use glycol for cooling. It replaces glycerine in many of its applications.

**Glycosides.** Class of substances occurring in the vegetable kingdom which yield a sugar and one or more other products when hydrolysed by acids. Glycosides in which the sugar constituent is glucose are called glucosides (*q.v.*). Among the glycosides are several used in medicine, *e.g.* digitalin and digitoxin obtained from foxglove (*Digitalis purpurea*); jalapin from *Convolvulus orizabensis* and *C. scammonia*; and strophanthin from strophanthus seeds. The group of drugs which owe their action to what are termed the cardiac glycosides includes digitalis, strophanthus, and squill.

**Glycosmis** (Gr. *glykys*, sweet; *osmē*, smell). Small genus of trees and shrubs of the family Rutaceae. They are natives of tropical Asia and Australia. The leaves are divided into three or more leaflets, and the small white flowers are fragrant. The fruits are small edible berries, those of *G. citrifolia* being esteemed by the Chinese for their delicious flavour.

**Glycosuria** (Gr. *glykys*, sweet; *ouron*, urine). Condition characterised by the presence of glucose in the urine. It may be temporary, in which case it is due to the intake of too much sugar, or to overaction of the adrenal glands in times of emotion or physical exertion. Sugar may be present in the urine when the blood-sugar content is normal, a harmless diabetes not demanding treatment. Chronic glycosuria characterises diabetes

*mellitus* (see Diabetes), and is the result of the failure of the muscles to burn or utilise sugar, which is therefore excreted by the kidneys.

**Glyn, ELINOR** (1864-1943). A British novelist. The daughter of Douglas Sutherland, of Toronto, and wife of Clayton Glyn, she was born in Jersey, Oct. 17, 1864. She achieved a popular success with her first book, *The Visits of Elizabeth*, 1900. Later publications include *Reflections of Ambrosine*, 1902; *The Vicissitudes of Evangeline*, 1905; *Three Weeks*, 1907; *His Hour*, 1910; *The Career of Katherine Bush*, 1916; *Man and Maid*, 1925; *It*, 1927; *The Flirt and the Flapper*, 1930; *Romantic Adventure* (her autobiography), 1936. During the 1920s she went to Hollywood, where she advised on love scenes. She died in London, Sept. 23, 1943. Consult *Life*, Anthony Glyn (grandson), 1955.

**Glyndebourne.** Opera house at Glynde, Sussex, England. Opened in 1934, this theatre was

(sometimes called alkyds. They can be combined with natural resins, *e.g.* copals, and with fatty acid or drying oil-modified oxygen convertible resins. Both oil- and resin-modified alkyds are compatible with nitro-cellulose, yielding surface coatings which show both increased adhesion and gloss retention. This led to wide use of the alkyds for motor car finishes. Increase in the demand for these materials has correspondingly increased the demand for naphthalene, formerly a coal-based product, but now also obtained from petroleum by aromaticisation. The bulk of current alkyd production goes into synthetic finishes; by American statistics this was over 245,000,000 lb. in 1944.

**Glyptic Arts.** Pertaining to carving, more especially to the art of engraving gems. The chief classes of engraved gems are: intaglios, which have the design sunk below the surface; cameos, which have the design carved in



Glyndebourne. The opera house founded in 1934 by John Christie at his home near the downland village of Glynde, Sussex

built by John Christie (b. 1882) and named after its builder's country house to which it is attached. Here the operas of Mozart, Verdi, and Donizetti were performed during summer. The theatre, with one of the largest and best equipped stages in Europe, had seating for 600. A restaurant was attached. The productions were under the direction of Carl Ebert, with Fritz Busch (1890-1951) as conductor. During the Second Great War the theatre was closed. Benjamin Britten's *Rape of Lucretia* was produced there in 1946, his *Albert Herring* in 1947. Regular seasons were resumed in 1950. In 1954 John Christie conveyed the opera house, mansion, and gardens to the newly formed Glyndebourne Arts Trust Ltd. (recognized by the Treasury as a charitable trust); and in the same year he was made C.H.

**Glyptal Resins.** Condensation products of polyhydric alcohols,

relief; and scarabs, the backs of which have a beetle carved in relief, while their bases have a design in intaglio.

Engraved gems have come down from ancient Greece, from the Cretan and Mycenaean epoch. The stones used included amethysts, cat's-eyes, beryls, garnets, and jasper. Malachite was used for seals; onyx and sardonyx for cameos. A carved jewel of this kind was treasured as a talisman in the ancient world. The influence of sculpture is often apparent in the engraved gems of 5th century Greece. Two intaglios in the British Museum have subjects recalling the caryatids of the Erechtheum and figures from the Parthenon frieze. Designs also depicted mythological scenes, and sphinxes and lions copied from scarabs. Under the Romans the glyptic arts fell into decay, but they flourished again during the Middle Ages in Byzantium.

**Glyptodon** (Gr. *glyptos*, carved; *odous*, tooth). Genus of extinct armadilloes, whose fossil remains have been found in the post-tertiary deposits of S. America. Some of these fossils represent an animal 9 ft. in length. The armoured carapace, instead of being in bands as in existing armadilloes, permitting the animal to roll up hedgehog fashion, was solid and continuous like the carapace of a tortoise. The head, feet, and tail emerged from under this dome, but the head was protected by a bony cap, and the tail covered by tubercled bony rings. The carapace was beautifully sculptured in small rosette patterns. The name was suggested by the deep ridges and grooves into which the surface of the molar teeth are moulded. *See* Fossil.

**G-Men.** Popular name for the agents of the Federal Bureau of Investigation in the U.S.A. (G standing for government). This bureau, founded in 1908, is charged with the investigation of violations of federal, as distinct from state, laws. Its widespread activities are mainly the result of its reorganization in 1924, when J. Edgar Hoover was appointed director. One feature is its laboratory, occupying a whole floor in the department of justice, where a staff of 400 carries out examinations of documents, firearms, explosives, etc. The collection of fingerprints has grown to more than 100,000,000. Candidates must be between 25 and 40 years of age, and must either be graduates of a law school or have had three years of public accounting practice after graduation at a school of accountancy. They are then sent to the F.B.I. training school at Quantico, Va. No G-man is known to the public by name.

**Gmünd** or **SCHWÄBISCH-GRÜND.** Town of Germany, in Württemberg. It stands in the valley of the Rems, 29 m. E. of Stuttgart. Formerly a free imperial city, it has still complete walls and towers, and some interesting churches, including that of the Holy Cross (14th century) and the pilgrimage church of S. Salvator, with two chapels hewn out of the rock. Gmünd is noted for its gold and silver ware, optical instruments, watch and tool making, etc. Pop. 22,430.

**Gmunden.** Town and pleasure resort of Upper Austria. In the Salzkammergut, it stands at a height of 1,400 ft. where the Traun leaves the Traunsee, 38 m. E.N.E. of Salzburg. The Traunstein rises sheer from the margin of the lake



Glyptodon. Skeleton of *G. clavipes* from the Pampas formation of Buenos Aires  
British Museum

to a height of 5,550 ft. Gmunden is a centre for hill and lake excursions. In addition to a Gothic church, theatre, and museum there is a kursaal. Cumberland castle was the seat of the Hanoverian dynasty after Prussia annexed Hanover in 1866. Pop. 8,200.

**Gnat.** Popular name for certain small dipterous (two-winged) insects of the Culicidae family. Some 29 species occur in Great Britain. The larval stage is passed in water, and the adult insects are most abundant in marshy districts. Blood-sucking in habit, they are also known as mosquitoes (*q.v.*).

**Gnathostomata** (Greek). Animals with truly jawed mouths. All vertebrates except the cyclostomes (lampreys, *q.v.*, and their allies) belong to this group.

**Gneisenau.** Name given to two German warships. During the First Great War the battle cruiser Gneisenau was flagship of Admiral von Spee's China squadron, which included her sister ship Scharnhorst and the light cruisers Leipzig, Dresden, and Nürnberg. On Nov. 1, 1914, this German squadron met and defeated Cradock's squadron off Coronel, but on Dec. 8, von Spee's ships were themselves caught and all but one destroyed by Sturdee's battle cruisers off the Falklands. (*See* Coronel; Falkland Islands, Battle of.)

In 1938 a second Gneisenau was completed for the German navy. A battleship displacing 32,000 tons with a length of 741 feet and beam of 98 ft., she had a speed of 29 knots. She mounted a main armament of nine 11-in. guns and a secondary battery of 12 5.9-in. guns, as well as 14 4.1-in. and 16 37-mm. A.A. guns. She carried four aircraft and had two catapults for launching them.

Early in 1941 the Gneisenau, in company with a new Scharnhorst, was operating against Allied shipping in the Atlantic. After sinking some 20 merchant vessels, both vessels put into Brest for refit, where they were joined a few months later by the Prinz Eugen (*q.v.*). There on March 30 the R.A.F. made the first of a total of 3,299 bomber attacks on these warships. The severity and persistence of the raids compelled the German admiralty to move them to a safer anchorage.

Escorted by a large number of destroyers, E-boats, and mine-sweepers, and protected by a strong umbrella of fighter aircraft, the three German warships slipped out of Brest during the night of Feb. 11-12, 1942. Bad visibility, breakdowns in the British air patrols, and jamming of the R.D.F. screen by the Germans, enabled the German squadron to escape detection until it had nearly reached Cap Gris Nez, where at 10.42 a.m. the Gneisenau and Scharnhorst were identified by two Hurricanes.

These aircraft raised the alarm, and at 12.30 p.m. six Swordfish torpedo-carriers under Lt. Comdr. Esmonde of the Fleet Air Arm went in to attack the squadron; all were shot down. Aircraft of Coastal, Bomber, and Fighter Commands took up the attack; eight M.T.B.s and six destroyers attempted to intercept the squadron; and at night magnetic mines were laid ahead of the enemy ships in the mouth of the Elbe. Both the Gneisenau and the Scharnhorst were damaged by these mines. The former reached Kiel, where she was subjected to further bombing attacks. She was then moved to Gdynia, where she lay until that port was captured by the Russians, March 28, 1945. They dismantled, reconditioned, and commissioned her as a floating battery.

**Gneisenau, AUGUST WILHELM ANTON NEITHARDT, COUNT VON** (1760-1831). German soldier. The son of a soldier, he was born Oct. 27, 1760, and was educated at the university of Erfurt. He served first in the Austrian army. With a German contingent he was

in America in the British service during the war of independence, and then he entered the army of



A. von Gneisenau,  
German soldier

Prussia. There he won promotion, and when, in 1806, Prussia again took up arms against France, he was known as a capable officer.

He helped to reorganize the Prussian army, and in the war of liberation served Blücher as chief of staff. He was responsible for the plan of campaign of 1814, and for that of the battles around Waterloo, and to him was due the ruthless pursuit of the French. In 1818 he was made governor of Berlin and a member of the Prussian council of state. In 1830 he was appointed to command an army on the frontier of Poland, where he died of cholera, Aug. 24, 1831. The standard life is by G. H. Pertz and H. Delbrück, 1864-80.

**Gneiss** (German). Coarse textured, crystalline rock. Strongly banded or foliated, it is somewhat like a streaky granite in appearance. It is composed of quartz, ferromagnesian minerals (e.g. biotite-mica, or hornblende), and, usually, feldspar. It is coarser than schist, and the dark and light coloured minerals are in distinct separable bands or lenticles. Gneisses are commonly distinguished from one another by some prominent, easily recognizable mineral which they contain (e.g., biotite-gneiss, hornblende-gneiss, sillimanite-gneiss). Gneisses in which eye-like lenses or individual crystals of feldspar or aggregates of quartz and feldspar occur are called augen-gneisses (Ger. *Auge*, eye).

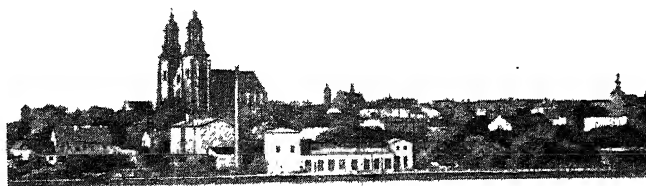
Some gneisses are produced by flow movements or the rhythmic settling of heavy crystals in igneous rocks when they were still fluid; others are the result of recrystallisation of stratified rocks under conditions of intense metamorphism, i.e. high temperature and pressure. Many gneisses are the product of impregnation or permeation of older solid rocks by solutions or even igneous rock in a highly fluid condition derived from depth in the earth's crust, and travelling along planes of weakness in the rocks. These fluids react chemically with the pre-existing material, causing a general softening of the whole mass which can then yield plastically to earth movements. On final solidification the rock crystallises in a more or less banded condition resulting from the movement or from initial differences in composition.

**Gneist**, HEINRICH RUDOLF HERMANN FRIEDRICH VON (1816-95). German jurist. Born at Berlin, Aug. 13, 1816, the son of a judge, he was educated at Eisleben and the university of Berlin. He be-

came a lawyer, but the study rather than the practice of law attracted him, and in 1844 he was made professor at Berlin.

From 1858 to 1893 he was a member of the landtag of Prussia; in 1868 he was elected to the diet of the North German Confederation, and from 1870 to 1884 he was a member of the Reichstag. In all he was an active member of the National Liberal party, and was active also as an advocate of legal reforms. During 1875-77 he was a judge of the supreme court of Prussia, and for a time was tutor to the future emperor William II. Ennobled by Frederick III in 1888, he died July 22, 1895. His works on England include *The English Parliament*, 1886, and *History of the English Constitution*, 1886.

**Gniezno** (Ger. Gnesen). Town of Poland. It is 31 m. N.E. of Poznan on the rly. to Torun. Poland's kings were crowned here, down to



Gniezno. View of the town and cathedral across the river Wrzemia

1320. It became the seat of an archbishop in 1000. The cathedral, founded in the 9th century, and largely rebuilt at the close of the 18th century, contains the tomb of S. Adalbert (*q.v.*) and bronze doors dating from the 12th century. The archiepiscopal palace is also noteworthy. There are manufactures of sugar, leather, and machinery, and a trade in dairy products, also breweries, flour, and mills for other products. In the part of Poland occupied by Germany in Sept., 1939, it was freed by the Russians Jan. 22, 1945. Pop. 26,000.

**Gnome**. Small legendary being in the folk-tales of many peoples, supposed to dwell in the earth and guard the treasures hidden there. Gnomes, dwarfs, and elves become almost inextricably interlinked in the folk-tales, though the elves are generally smaller, more fairy-like creatures, while the gnomes or earthmen are more akin to the black dwarfs of North European folklore. See *Folklore*.

**Gnome** (Gr. *gnōmē*). Maxim, aphorism, or reflection summing up or stating concisely a general

truth. The Greek Gnostic poets were those who wrote sententious didactic verses, and included Solon, Theognis, and Phocylides.

**Gnôme-et-Rhône**. An aero-engine works at Limoges, France. Built in 1939 as one of the four main factories for the French air force, it became of increasing importance to German war economy as the Allies air attacks on Germany grew. On the night of Feb. 8-9, 1944, the R.A.F. attacked this works, using for the first time 12,000-lb. "factory buster" blast bombs; 20 bays out of 48 were entirely destroyed. After the end of the Second Great War the works was nationalised, 1945.

The name of Gnôme is a notable one in the aero-engine industry. The 50 h.p. Gnôme of 1909 was the first successful engine of the rotary air-cooled type. Later the firm manufactured a large number of radial engines, including British designs under licence.

**Gnomon**. Vertical pillar of which the shadow cast on a horizontal surface was used by the ancients for astronomical observations of latitude, azimuth, and time. The term is now applied to the inclined style of a sundial.

**Gnomonic Projection**. System of cartography. In a map drawn on this projection, all great circles are drawn as straight lines radiating from a particular point selected according to the purpose for which the map is required. A gnomonic chart or map is produced by projecting a spherical map of the world on to a plane, which touches the globe at one point. When this tangential point is located at the site of a radio direction finding station, the chart can be used to lay off in straight lines the true bearings of distant transmitting stations as observed on a ship's or aircraft's direction finder. See *Chart: Direction Finding*; Mercator.

**Gnosticism** (Gr. *gnōstikos*, knowing). Term usually applied to the heresy with which were concerned sects that sprang up in the 1st century A.D., the members of



which claimed mystical knowledge denied to the world. The name was adopted first by the Ophites.

Gnosticism existed before Christianity. Originating in the East, it embodied attempts to formulate a cosmic philosophy or theory of the universe, and a quest for a world religion. An example of syncretism, *i.e.* the blending of opposite and conflicting ideas into a harmonious whole, its sources were Zoroastrianism, Buddhism, and accretions from Judaism, Mithraism, and the mythologies of Babylon, Egypt, and Platonism.

While, broadly speaking, Gnosticism was a form of dualism—mind and matter; light and darkness; good and evil—it embodied not one but protean forms of thought. It is characterised by association with the idea of emanation, a theory of creation which postulates One Supreme Being from whom lesser beings or aeons have emanated as light emanates from the sun. From the fall of one of these lesser beings into the outer void arose a Demiurge, regarded as the embodiment of evil, from which redemption is possible only for two of the three classes into which Gnosticism divided mankind, by reunion with the Infinite—a state comparable with the Buddhistic nirvana. A Gnostic's view of Jesus Christ is given in the apocryphal epistle of Barnabas (*q.v.*).

Gnosticism assumed a new form after the rise of Christianity; and gained a strong foothold in the 2nd century. Information about the leading Gnostics and their writings is largely derived from the anti-heretical treatises of the Christian Fathers—Irenaeus, Tertullian, Hippolytus, Epiphanius, Ignatius, and Justin Martyr; from the Pistis Sophia, a 3rd century Coptic work.

Gnostics interpreted the Scriptures for their own purpose; and one result was the formulation by the Catholic Church of its standards of orthodoxy. Gnosticism died out in the 6th century, but was reflected in Manichaeism, an attempt to fuse Zoroastrianism, Gnosticism, and Christianity; in Paulicianism; in the beliefs of the Cathari and Albigenses; and in Rosicrucianism.

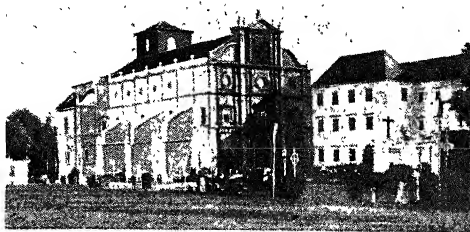
The reputed founder of post-Christian Gnosticism was Simon Magus (*see* Acts 8), the supposed author of a work called *The Great Revelation*, of which only fragments remain. It had two prominent schools; one in Alexandria, of which Basilides, Valentinus, and Carpocrates were leaders, and one in Syria, of which Saturninus and Cerdo were among the teachers. The last leader of note was Marcion, who conceived three primal forces; the good God, as revealed by Jesus Christ; evil matter, under the rule of the devil; and the Demiurge, newly identified with the Yahveh of the Jews.

These sects wandered between extremes of asceticism and sensual immorality; and included, in addition to those named after their leaders, the ascetic Encratites or Continentes, and the serpent worshipping Ophites or Naaseni. One influence that worked against Gnosticism, by means of a rival theory of the universe, was Neoplatonism (*q.v.*). An important branch of study in connexion with the heresy is concerned with its elaborate and mythical symbolism, secret terminology, and use of inscribed talismans and amulets. The supposed Scriptural references to Gnosticism, *e.g.* John 1; 1 Tim. 1, v. 4; 2 Tim. 2, v. 18; Tit. 3, v. 9, are debatable. *See* Abraxas; Docetism; Ophites; Valentinians.

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**GNU, OR WILDE-BEEST.** Large antelope, differing from all others in having a heavy head and neck

which somewhat suggest the appearance of a small bison. There are two genera: *Connuchietes*, the white-tailed, and *Gorgon*, the brindled, both natives of Africa. The horns curve downwards and then upwards. The muzzle is remarkably wide, the neck has an erect mane, and the tail has long, thick hair almost like that of a horse. The animal stands rather more than 4 feet high at the



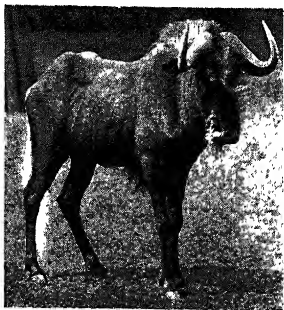
Goa. The church of Bom Jesus, completed 1603, in which is buried S. Francis Xavier, the apostle of the Indies

shoulder, lives in the open country, and is generally found in company with the zebra. *See* Antelope.

**Goa.** Portuguese possession in India; with Daman and Diu it forms an overseas prov., area 1,500 sq. m., of Portugal (until 1951 a colony). Goa, an enclave on the W. coast of India, is bordered on the W. by the Arabian Sea, elsewhere by the states of Bombay and Mysore. About a third of its area (1,334 sq. m.) is under cultivation; rice, spices, coconuts, pepper, betel and cashew nuts are grown. Some 20,000 tons of salt are produced annually; iron and manganese are mined. New Goa, the capital of Portuguese possessions in India since 1843, includes Panjim. Except for some of its churches, still in excellent preservation, Old Goa, once the wealthiest city in India, is a city of ruins. Here, in the church of Bom Jesus, is buried S. Francis Xavier. Goa belonged to Portugal from the time of its capture by Albuquerque in 1510. Pop. (est. 1950) 590,000.

In 1950 India proposed negotiations for the transfer to the Indian Union of Portuguese possessions in India. Goans favoured transfer; but Portugal refused to consider it, and from 1954 India instituted a land blockade, with the result that Goan trade, by tradition with India, was diverted seawards, in particular to Karachi and the U.S.A.

**Goalanda OR GOALUNDO.** A village and subdivision of Pakistan, in the Faridpur dist., E. Pakistan. Goalanda village is 151 m. N.E. of Calcutta, and is the terminus of



Gnu. White-tailed variety. The animal is found only in Africa  
Gambier Bolton, F.Z.S.

the Eastern Bengal Rly. and an important port of call for river steamers on the Ganges.

**Goalpara.** District and subdivision of India, in W. Assam. It lies to the S. of Bhutan, and, although fertile, is very unhealthy. The capital of the district is Dhubri (pop., 1951, 22,787), which stands on the river Brahmaputra, some 200 m. W. of Shillong. Pop. (1951) district, 1,108,124.

**Goat.** A genus of the group Bovidae, which includes also oxen, sheep, and antelopes. The goats



Goat. 1. Toggenburg. 2. Nubian. 3. Anglo-Nubian. 4. Irish

are placed between sheep and antelopes, and it is difficult to distinguish them from sheep. Certain species of wild sheep approach goats very closely in structure and appearance.

Goats differ from sheep in the bony structure of the skull, and the horns are placed close together immediately above the eyes. The males are usually bearded, and have a strong odour. They lack the glands on the hind feet, and have callosities on the knees. While they live in herds, they associate less intimately and are of more independent disposition than sheep. The flesh of the kid is excellent, but that of the adult is apt to be tough and rank.

The goat in its wild state inhabits the Eastern hemisphere exclusively, the so-called Rocky Mountain goat of N. America not being a true goat, but belonging to a genus approaching the antelopes. It is widely spread in S. Europe and Asia, but in Africa occurs wild only in Egypt and Abyssinia. So far as is known, the wild goat has never inhabited the British Islands, the so-called wild goats of some parts of Scotland and the Achill Islands being domesticated goats that have taken to a feral life. Only about ten species of wild goat are recognized by naturalists, and of these three or four are known by the name ibex (*q.v.*).

The true wild goat is a native of Persia, Asia Minor, and some of the Mediterranean islands, and it is from this species that the domesticated goat has descended. The varied form of the horns in domesticated varieties suggests their mixed origin. Its domestication dates from prehistoric days, for its remains have been found in the Swiss lake dwellings, and it was well established in the earliest Egyptian period. Among domesticated breeds may be specially mentioned the Cashmere and Angora goats, noted for their very valuable silky hair. (*See* Cashmere Goat.)

**GOAT KEEPING.** Goats are kept in large numbers in many countries, both for the sake of their hides and hair, and also as a source of dairy products. Their value is not fully realized in Great Britain, although a British and an Irish goat society have both done valuable work. To cottagers and smallholders the goat is of particular value as a milk producer. It is hardy, easy to keep, and thrives on a miscellaneous diet.

Goats' milk is relatively rich in butter-fat and casein, its percentage composition being: water, 85.71; casein, 3.20; albumin, 1.09; milk-sugar, 4.46; fat, 4.78; ash, 0.76. Goats are almost free from tuberculosis, and infants fed on their milk not only thrive but run no risk of contracting this disease. If perfect cleanliness is maintained, especially by careful washing of the udders before milking, the unpopular "goaty" flavour is absent. Butter made from goats' milk is white and does not look attractive. Goat cheeses are much esteemed. A goat is not worth keeping unless it yields at least 2 quarts per day at kidding, an amount that is often greatly exceeded. To secure good results a suitable breed, *i.e.* one bred from milk-giving strains, must be selected. The Toggenburg is most esteemed, after which come the Anglo-Swiss and Anglo-Nubian cross-bred varieties.

The best time for mating is Sept. to March, but by using the foreign breeds or crosses with them, kidding can be arranged for any time, and a winter supply of milk ensured. Kids not required for addition to the herd are killed at birth, especially the males. Except for a little corn, summer feeding (May to August) costs hardly anything, the animals being put out on rough grazing. Tethering, though usual, is not good for the animals; but if not tethered they must be confined by strong, high fencing, as they are very destructive. At other times the grass available must be supplemented by a miscellaneous ration, which may include hay, roots, offals, cake, and various scraps, such as potato-peelings, garden refuse, and acorns. Water and salt must be provided. A few animals can be housed during winter in any available building, but a herd should be accommodated in a suitably constructed goat-house. *See* The Book of the Goat, H. S. H. Pegler, 5th ed. 1917.

**Goat Fell.** Mountain of the Isle of Arran, Scotland. It lies 1½ m. N.W. of Brodick. Composed of granite, it is of volcanic origin. It is 2,866 ft. high.

**Goat Moth.** Large moth of the genus *Cossus*, found in most parts of Great Britain. The fore wings, often over 3 ins. in expanse, are pale grey clouded with brown, with a kind of network of fine brown lines. The hind wings are grey, with very fine reticulations. The caterpillar is flesh colour, with reddish brown patches, and is almost hairless. When it is alarmed it gives out a strong and offensive goat-like smell, from which the moth derives its name. It lives in the wood of willow, ash, and elm trees, eating out long burrows often large enough for a finger to

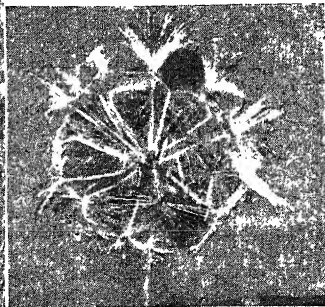
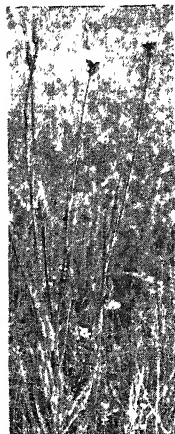


Goat Moth. Specimen of *Cossus ligniperda*

go in. It takes three years to come to maturity, and does great damage to the timber, the destruction of the tree being by no means unusual. It is about 3 ins. long.

**Goat's-beard** (*Tragopogon pratensis*). Perennial herb of the family Compositae. A native of Europe and N. and W. Asia, it has a tap-root with milky juice, and the slender, alternate leaves, 5 to 9 ins. long, clasp the stem at their bases, which are dilated, especially in the upper leaves,

and taper to a long point. The solitary flower head is yellow, with 7 or 8 slender bracts. The head opens about 4 a.m. and closes as soon as pollinated, whence the popular name John-go-to-bed-at-noon. The



Goat's-beard. Left, the growing herb; right, puff or head of fruit

fruits form a "clock" like those of the dandelion, but larger and more beautiful, the parachute of each fruit having its arms feathered. The salsify (*T. porrifolius*), grown as an esculent root, belongs to the same genus. Its flowers are purple.

**Goat's Rue** (*Galega officinalis*). A perennial herb of the family Leguminosae. A native of S. Europe, it has a stout, creeping rootstock, and the compound leaves consist of about 15 lance-shaped leaflets. The leafy stems are about 2 ft. high, with a flowering branch at the base of each of the upper leaves.



Goat's Rue. Flowers and leaves of this S. European herb

The pea-like flowers are blue, but there is a variety with pure white flowers. It was formerly made into a cordial for administration in fevers and convulsions, and has been grown for forage.

**Goatsucker** (*Caprimulgus europaeus*). Alternative name for the nightjar (*q.v.*).

**Gob.** Waste material used in coal mines for filling up stalls. In the pillar and stall system of coal mining, large openings or stalls are left in the coal face, separated from one another by a wall of coal which is left standing. When all

the coal has been got from a stall it is filled with any refuse or waste material that may be at hand. Material so employed is called by the miner gob, or goaf, though the latter term is more generally reserved for the stall itself from which the coal has been removed, the plural "goaves" being the form generally used. This use of

the term gob has doubtless arisen from the similarity between the appearance of the opening into a stall and a huge mouth, the word being vulgarly used in many parts of the country for a mouth or mouthful. Gob corresponds to the attle or deads of the metal miner.

**Göbbels.** Alternative spelling of the surname of the German politician Josef Goebbels (*q.v.*).

**Gobelin, JEAN** (d. 1476). French dyer. A native of Reims, he founded in 1450 a dyeworks and cloth factory on the banks of the Bièvre, in St. Marcel, a suburb of Paris. The firm was renowned

especially for scarlet wool, but probably the works would never have enjoyed more than a local reputation had not Henry IV. about 1603, purchased from the Gobelin family part of the land adjoining the dye-house. Here tapestry sheds were erected for Marc de Comans and François de la Planche, two expert designers, but the establishment was still called by its old name, which gradually became attached to the new products.

**Gobelin.** Tapestry named from Jean Gobelin. In 1667 Louis XIV consolidated the royal Parisian tapestry workshops at the Hôtel de Gobelins. Le Brun and other eminent artists provided magnificent designs such as The History of the King. Suspended in 1694, work was resumed in 1697. Smaller tapestries, portières of the Gods, etc., were made under Louis XV, but prosperity returned with the beautiful designs of Boucher. The Revolution crippled the industry, but later the designs of Baudry brought success. From 1826 carpets also were made. Modern tapestries from designs by Galland adorn the Comédie Française, others by Toudouze are in the Palais de Justice, Rennes. Many replicas of ancient works have been executed at the Gobelins workshops. See Tapestry.



Gobelin. Example of a piece of tapestry depicting a scene from the adventures of Don Quixote, entitled Don Quixote led by Folly, from a cartoon drawn by C.A. Gouzel (1694-1752)

**Gobi** OR SHAMO. Desert of Central Asia, mainly in Mongolia, China. "Gobi" means desert, "Sha-mo," sand desert. The fractured tableland of Mongolia terminates on the N. at a scarped edge overlooking Siberia; from this edge the land rises towards the Inshan and Khingan Mts., of which the E. and S.E. slopes form an escarpment facing the valley of the Hwang-ho. The average level of the plateau is 4,000 ft.

The climate is one of great extremes, and is almost rainless, with the result that there are no large rivers. Nomad Mongols and Kalmacks are the only inhabitants; they find sustenance for their camels, horses, and sheep at the water-holes. Vast expanses of sand-dunes are marked by a silence undisturbed by any form of life. The desert is crossed by caravan routes; and in 1917 a summer motor-car service from Kalgan to Urga (1,160 m., 4-6 days) was inaugurated.

Westward the desert area narrows and leads between the Tianshan and Kuen-lun ranges to the Tarim basin, which forms the basin of internal drainage of Lob Nor; this is the Chinese province of Sin Kiang, Eastern Turkistan, where the scanty rainfall ameliorates the harsher desert conditions of the east. In the dim geological past, the Gobi, known to the Chinese as Shamo, was covered by the eastern portion of a great sea, of which the Caspian and Mediterranean are relics. To the N.E. was the ancient continent of Angaraland, and to the S. that of Gondwanaland. The tilting of the plateau and the rise of the Kuen-lun ranges, including the Khingan Mts., are a more recent development. *See Asia; Desert. Consult Across the Gobi Desert, S. Hedin, 1935; The Gobi Desert, M. Gablet and F. French, 1943.*

**Goblets, THE.** Pair-oared boat race rowed annually at Henley-on-Thames. It was inaugurated in 1845, and its full title is The Silver Goblets; the Nickalls Challenge Cup is also presented to the winning pair. *See Henley Royal Regatta.*

**Goblin** (Gr. *kobālos*; late Lat. *gobelinus*; Ger. *Kobold*). Mischievous or evil being. The word is supposed to derive from the Gr. *kobālos*, a sprite, a rogue, and to be the same as the Ger. *Kobold*, spirit or demon of the mine; another origin suggested is that of the *Gobelinus* or demon which S. Taurinus drove from a temple in Normandy; while yet another, and

somewhat ridiculous, derivation has made elf and goblin to be but Guef and Ghibelline in a new form. Goblin has come to be applicable nowadays to any frightening phantasm. *See Folklore.*

**Goby** (*Gobius*). Large genus of fishes. Several species occur round the British coasts, especially in rocky neighbourhoods. Small in size, the pelvic fins are modified to form a sucker by which they can attach themselves to rocks. The freckled goby (*G. minutus*) is often found at a considerable distance up the Thames, and constructs a curious little nest in the sand for its eggs.

**Goch.** Town of Germany on the Niers, near the Dutch border. In the Middle Ages, it was part

of the duchy of Cleves, and a centre of the linen trade. An important road junction with a number of factories, it was reduced to ruins during the Second Great War, when it was a German key position in the Reichswald. After it had been bombed from the air and shelled by artillery, Scottish infantry attached to the Canadian 1st army made a silent assault on it in the night of Feb. 18-19, 1945, capturing the garrison commander, Col. Paul Matussek, and his staff in bed, and securing two-thirds of the town. Snipers continued to hold out tenaciously, however, until with the help of Welsh troops the town was cleared on the 21st. Of the pre-war pop. of 14,000, only a handful remained.

## GOD: THE SUPREME BEING

Rev. H. L. Goudge, D.D., Regius Prof. of Divinity, Oxford, 1923-1939

*Cognate articles in this work are those on Christology; Heaven; Jesus; Trinity. See also Buddhism; Christianity; Deism; Mahomedanism; Monotheism; Theism; Theology, etc.*

For the best theists today the word God stands for the one ultimate personal ground of all existence, the source of the order and beauty of the universe, and of those ideals of truth, beauty, and goodness which have led man thus far upon his upward way.

Religion, says Schleiermacher, is the feeling of absolute dependence, the immediate consciousness of all that is finite as existing in and through the Infinite, of all that is temporal as existing in and through the Eternal. God is thus revealed in and through the experience of man, and, the higher and fuller the experience, the higher and fuller is the revelation attained. Christians believe that Christ is God's highest means of revelation, but not His only means. The knowledge of God is attained by many paths. Thus, though man is a religious being, and is almost always found believing in a God or gods, his conceptions of God vary greatly, and the highest conception reached has a long history behind it. No adequate definition of God can be given, since God by His very greatness can be but imperfectly known.

### The God of Israel

The Christian view of God is the result of a long process, which the Bible enables us to trace. The people of Israel, from whom Christ came, began with a conception of God differing little from that current in kindred tribes. They thought of their God at first as peculiar to themselves rather than

as the God of the universe, and they learned to know Him in their own national experience. His revelation of Himself had been in facts, rather than in words. He was a "living God," Who by wondrous means had lifted them out of slavery, brought them to their own land, protected them when they obeyed Him, and punished them when they disobeyed. But from very early days their conception of God was a moral conception as the conceptions of the tribes around them were not. God had shown Himself in their experience to be a God of truth, and righteousness and love (*cf. Exodus 24, v. 6, 7*), and He asked righteousness and love from them in their dealings one with another. In the best of the Hebrews it was God's character which was the primary fact about Him, rather than His power or knowledge. This moral conception of God was deepened and enlarged by the teaching of the long line of prophets in Israel's history.

This people, long before the coming of Christ, had learned that their God was "the God of the whole earth" (*cf. Isaiah 54, v. 5*), but the moral conception held its ground. It is still the character of God and the nature of His purpose which occupy the foreground in the consciousness of Christians. In the life and death of Christ for men, in all that He has done and is doing for them, the power and wisdom of God are clearly revealed, but His righteousness and love are revealed more clearly still.

The great words "God is love" are the summary expression of what God has been found in Christ to be. To this righteous love all other "attributes" of God are subordinate. His eternity and omnipresence are the eternity and omnipresence of love and holiness, His omnipotence and omniscience instruments which serve them. The vast additions made in modern days to our knowledge of nature and of history have indeed widened our conception of God's methods and purposes. Art has taught us to find a new revelation of Him in all sublimity and beauty; but the revelation of God's character and of the nature of His purpose stands where Christ has left it.

#### Authority and Acceptance

This conception of God comes to us at first, like other truth, upon the authority of others, but it needs to be verified by each man for himself by consideration of the experience on which it rests and by the effort to share it. The so-called "proofs" of God's existence are simply the ways in which He makes Himself known. Man's discovery of God and God's revelation of Himself to the individual and to the race are two sides of the same process.

But the need of seeking after God must be recognized. God's revelation does not force itself upon us. There must be the desire and the effort to know, and such a moral sympathy with the character of God as will render the revelation possible. So it is that Christ says, "Blessed are the pure in heart; for they shall see God" (Matthew 5, v. 8), and again "If any man willeth to do God's will, he shall know of the teaching, whether it be of God, or whether I speak from Myself" (John 7, v. 17). Belief in God has difficulties to overcome, and only those who are morally faithful to the light of conscience are likely to overcome them.

Why, firstly, do we find the ultimate ground of all that exists in a personal Being? The reason lies deep in our own nature. Man is conscious of himself as the cause of his own actions, and of the changes which they bring about in the world. Soon he becomes conscious of his fellow men, as acting with a will and purpose resembling his own. Thus, he inevitably explains the changes which he sees in the world by will and purpose, and, as he comes to recognize the unity of the world, by the will and purpose of the one God. No higher explanation is open to him, since personality is the highest fact he knows. At first he may regard God simply as a magnified man, but,

as he rises above this, he does not cease to believe that God is living and personal. Though the nature of God in its fullness must transcend our understanding, He cannot be lower in the scale of being than ourselves. Though He may be more than personal, He cannot be less. The world demands an explanation; and our minds can rest only in the thought of a Being with will and intelligence as the cause and ground of all that experience reveals to us.

Secondly, the world which we seek to explain is a world of order and of beauty, a world which everywhere exhibits the adaptation of means to ends, and in which each end when attained serves as a means to higher ends beyond. Though there may seem to be waste in nature and disorder in history, there can be no doubt that both nature and history are eloquent witnesses to God's wisdom and power, and in some degree to the benevolence of His purpose. But the world has issued in living beings, and in the case of man, in beings who recognize the difference between right and wrong, and the obligation, be the cost what it may, to choose the higher of the courses open to them. This again brings a revelation of God.

Though conscience, like reason, has been a gradual growth in close connexion with man's environment, a true explanation of the world must take account of it. Man himself is the "roof and crown of things," and no explanation of the world can be true which ignores the ideals which have made him what he has at his best come to be. A world in which beauty, truth, and goodness are felt to possess an infinite value is a world which must minister to a moral purpose, and the presence of our highest ideals must be our own sharing in the thought of God. It is this which assures us that, though God is the ground of all that exists, He must not be regarded as the author of evil.

#### The Problem of Evil

The problem of evil is the greatest difficulty which belief in God has to surmount, but the revelation of God which conscience brings shows us how to regard it. Evil is no part of the creation; it arises from the misuse of what is good by the freewill of man. The possibility of evil is a necessity, if good is to be freely chosen. A world in which evil choice was impossible would be a world without struggle or sacrifice; the existence of moral evil in the world, like the existence of pain, with which it is intimately connected, has a place to fill in the development of human souls, and

this is the highest purpose of God which we are able to trace. It is in conflict with evil that the righteousness and love characteristic of God are developed also in men. In all these ways, quite apart from the special revelation which the Bible records, God may be known by men who open their eyes to the light.

But though these paths of knowledge are open to all, they require a certain character for their appreciation. It is the man who himself acts with the most intelligent purpose who will appreciate best the intelligent purpose revealed in nature and in history, and the man most faithful to his ideals who will best see the character of God revealed in them. So it is that, though the best non-Christian philosophy has reached results very similar to the Christian view of God, its influence outside Christendom has been but slight. Just because the acceptance of moral evil has so largely blinded us, some higher revelation of God is required.

#### God and the Christ

The character of these new paths to knowledge has been already seen. They are not altogether different from the universal proofs, but rather the same proofs brought more closely home to us. The history of Israel and of the Church witnesses to God as all history witnesses to Him, but more clearly; the ideals of the prophets witness as all ideals witness, but more fully.

The wisdom and power of God shine out more clearly in Christ than anywhere else, and the character of God in a way absolutely unique, while sin and pain, the great hindrances to faith, though not fully explained, are illuminated by the Cross. God is seen taking them upon Himself, and making them the path to the highest good. Moreover, Christ, as no one else, has led men to seek after God, and enabled them to be sure that they have found Him. The crowning proof of God's existence and character is the multitude of those who have come to know God, and who trace to this knowledge all that is best in themselves and most fruitful in their life and activity.

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**Godalming.** Bor. and market town of Surrey, England. It stands on the Wey, 35 m. S.W. of



Godalming arms

London, and is served by railway. The chief buildings are the church of SS. Peter and Paul, the old town hall, and the market house; the church contains some Norman work. The town has a technical and art school. It has still some half-timbered houses of the 17th century. The chief industries are drug-making and knitting; there is trade in malt and corn. Bargate stone is quarried in the neighbourhood. The place, which is mentioned in Domesday Book, became a borough in 1575. It was long a centre of cloth manufacture. Pop. (1951) 14,244.

Within the bor. is Charterhouse School. This was founded in London by Thomas Sutton in 1611, his foundation being for a school and a home for 80 poor men. In 1872 the school was removed to a site at Godalming on which commodious buildings, in the Gothic style, were erected. The buildings include chapel, laboratories, library, etc. The 11 houses accommodate about 650 boys; there are scholarships to the school. Boys may also receive grants according to need, to enable them to continue their education at a university or other institution.

**Godavari.** River of S. India, 900 m. in length. Rising in the Western Ghats, N.E. of Bombay, it flows across the Deccan to the Bay of Bengal. One of the most sacred rivers of India, it is a great resort of pilgrims. The chief tributaries are the Pranhita and the Manjera. It gives its name to rice-producing coastal districts of Andhra Union, East Godavari (pop., 1951, 2,414,808) and West Godavari (1,697,727).

**Godsberg** or **BAD GODESBERG.** Town and spa of Germany, on the left bank of the Rhine 4 m. S.E. of Bonn. In 1949 it became the seat of the federal president and other high officials of the Bonn government. The ruins of an old castle, destroyed in 1583, overlook the town, which, sheltered by mountains, has

a mild climate. Pop. (estimated) 25,000.

Godsberg was the scene of the second meeting between Neville Chamberlain and Hitler during the international crisis of Sept., 1938 (see Munich Crisis).

During the Second Great War the town was captured by the U.S. 1st army, March 8, 1945.

**Godetia** (*Oenothera*). Section of the evening primrose genus, part of the family Onagraceae. They are natives of the warm parts of America. Evening primroses all have yellow flowers, and do not open in sunshine; but the godetias have white, rosy, or purple flowers which do. They are annual herbs.

**Godfather and Godmother.** Sponsors for an infant presented

for baptism, but two are usually required. Godparents were formerly called Gossips, from God and sib, kindred, i.e. relations in God. See Baptism.

**Godfrey** (c. 1081-1100). Count of Bouillon and crusading leader. The son of Eustace, count of Boulogne, he was made count of Bouillon and later duke of part of Lorraine by his master, the emperor Henry IV. In 1096 he offered himself for service as a crusader and was one of the leaders of the host that marched across Europe to Constantinople and the Holy Land. In 1099 he had an honourable part in the successful siege of Jerusalem, and he was chosen its king, but refused the title, although he undertook the duties of ruler. He remained there, beating off attacks, especially when at Ascalon in 1099 he crushed the Saracens, and to some extent enlarging his authority until his death in July, 1100.

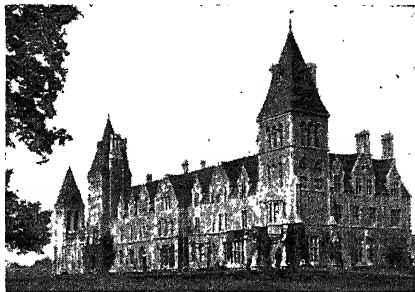
Godfrey's fame became legendary in the medieval romances; he was the hero of two notable French *chansons de geste*, and of a legend which has close resemblances to that of Lohengrin.

**Godfrey, CHARLES** (1790-1863). British musical conductor. Born at Kingston-on-Thames, Nov. 22, 1790, Godfrey entered the band of the Coldstream Guards as bassoon player, and in 1828-63 was bandmaster. He founded Jullien's Journal, the first English publication devoted to military music, was appointed musician in ordinary to the king, 1831, and died Dec. 12, 1863. Several of his sons and grandsons followed the same calling. The eldest son, Daniel, or more commonly Dan (1831-1903), was bandmaster of the Grenadier Guards, 1856-96, and then had a band of his own. He died June 30, 1903. Another son, Adolphus Frederick (1837-82), succeeded his father as bandmaster of the Coldstream Guards.

Charles (1839-1919), the third son, was bandmaster of the Royal Scots Fusiliers and then of the Royal Horse Guards from 1859 to 1904, and professor of military music at the Royal College of Music and the Guildhall School of Music. Daniel's son Dan, born June 20, 1868, in London, became a conductor of opera and symphony concerts throughout England, and



Godetia. Flowers of this annual plant



Godalming, Surrey. Buildings of the Charterhouse School, which moved here from London in 1872  
Frith

for baptism, required as an assurance that the child will be brought up in the Christian faith. Their duty is to answer the interrogatories put to them at the font, and afterwards to see that the child is instructed according to the promises made in his name and in due time brought to the bishop for confirmation.

The custom derives from the primitive church, when guarantors of the character of persons brought for baptism were an obviously necessary precaution. Parents were commonly the sponsors, as being the natural and proper guardians, and the 29th Canon, of 1604, forbidding their admission to the office, was intended simply to provide additional security for the religious training of the infant. In the Anglican Church, three sponsors are required, two of them of the same sex as the child; in the Roman Catholic Church one





Sir Dan Godfrey,  
British musical  
conductor

music for military bands. He died July 20, 1939.

**Godfrey, Sir Edmundbury** (1621-78). An English politician. Member of a Kentish family and educated at Westminster and Oxford, he became a woodmonger in London and justice of the peace for Westminster, and was knighted, 1666, for his services during the plague. Before him, Sept.



Sir Edmundbury  
Godfrey,  
English politician  
After Vanderbank

6, 1678, Titus Oates first swore the particulars of the notorious Popish "plot." On Oct. 12 Godfrey was missing, and five days later his body was found at Primrose Hill.

He was almost certainly murdered, perhaps at the instigation of Jesuits, but by whom has never been established. Three men were hanged on the evidence of an informer whose perjury was afterwards confessed and established.

**Godhra.** Town and subdivision of Bombay, India, in the W. part of Panch Mahals dist. The area of the division is 585 sq. m. Godhra town has an important timber trade. Pop. 41,986.

**Godin, Jean Baptiste André** (1817-88). French socialist. Born at Esqueheries, Jan. 26, 1817, he became an employee in the iron-works there. In 1840 he set up in business for himself, and made a considerable fortune. He introduced profit-sharing into his business which, after it had been transferred to Guise, he turned into a cooperative association. He also erected dwellings, called familistères, for the workers, and in other ways showed himself a genuine believer in the socialist ideas he had learned from Fourier. Godin was a member of the National Assembly, 1871-76. He died Jan. 15, 1888. He wrote much on socialism and industrial problems. See Profit-Sharing; consult also Twenty-Eight Years of Co-Partnership at Guise, A. Williams, 1908.

from 1893 to 1934 was director of music to the corporation of Bournemouth. He was knighted in 1922. He published many arrangements of music for military bands. He died July 20, 1939.

**Godiva, Lady.** Wife of the 11th century Leofric of Mercia. According to legend, Leofric made harsh exactions on his people of Coventry; consequently his wife begged for their removal, which he promised to grant if she rode naked through the town. Lady Godiva accepted the terms. The people of Coventry kept close within doors, their windows shuttered, during the ride; all save a certain tailor, who, peering through a chink, was struck blind, and has ever since been known as Peeping Tom. The legend was commemorated at Coventry fair from 1678 to 1826 by a Godiva procession that has been revived intermittently in more recent years, and it is the subject of a well-known poem by Tennyson.

**Godmanchester.** Mun. bor. and parish of Huntingdonshire, England. It stands on the Ouse,  $\frac{1}{2}$  m. S. of Huntingdon, and has a railway station. The town occupies the site of the Roman station of Duroilipons. Mentioned in Domesday, in 1213 it received a charter from King John, and was incorporated in 1605 as a borough; it is now governed by a mayor and corporation. The church of S. Mary is a fine 14th century Perpendicular building; the tower and spire were rebuilt in 1623. There are several fine timbered houses of the 17th century, and a grammar school founded in 1567. The curfew is still rung. The chief industry is agriculture. Pop. (1951) 2,499.

**Godolphin, Sidney Godolphin, 1st Earl of** (1645-1712). English politician. Of good family,



1st Earl of Godolphin,  
English politician  
After Kneller

he came somehow to the notice of Charles II, to whose household he was attached during his exile. In 1668 he entered the house of commons as M.P. for Helston, but it was not until 1679 that he became prominent in affairs of the state. Having by then made a certain reputation as a student of finance, he became a member of the treasury board and one of the king's chief advisers, the little group being called the chits. In 1684 he was made a secretary of state, and a little later first lord of the treasury.

In 1690, after a brief absence, Godolphin returned to the treasury, but he was not loyal to William, and his secret intrigues with

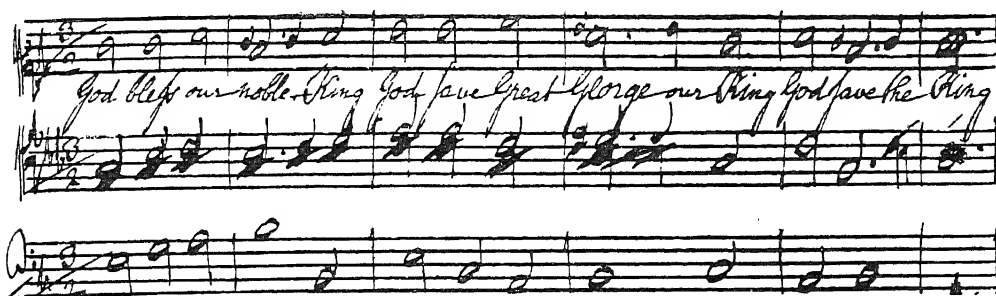
James II, in which he was associated with Marlborough, led to his resignation in 1696. In 1700, however, he was again in office. In 1702 he was made lord treasurer, but he shared the fate of his great associate, being dismissed from office in Aug., 1710. During these eight years he was mainly responsible for directing the country's affairs. In 1706 he was made an earl. He died, Sept. 15, 1712. Consult Life, Sir Tresham Lever, 1952.

**Godoy, Manuel** (1767-1851). A Spanish statesman. Born at Badajoz, Feb. 12, 1767, Godoy became an official of the court, a royal favourite, and was made duke of Alcudia. During 1792-97 he was chief minister of Spain, being responsible for the declaration of war on France and the humiliating peace of Basel, 1795. He was again premier in 1801 and also general of the Spanish forces, which he led into Portugal, this time being in alliance with France. He was victorious, but the defeat of the Spanish fleet at Trafalgar added to the number of his public enemies, and he narrowly escaped death during an insurrection in 1808. His public career was over, and he lived in Rome and Paris almost forgotten until his death, Oct. 7, 1851. Godoy's Memoirs, dealing with the reign of his patron Charles IV, were published in English in 1836.

**Gods.** For details of various pagan deities, e.g. those of ancient Greece, Rome, Scandinavia. see Mythology.

**God Save the King (Queen).** British national anthem. The origin of both words and music is unknown. The earliest extant version of both together appeared in The Gentleman's Magazine, Oct., 1745, following upon the singing of the anthem (to an arrangement by Dr. Arne) at Drury Lane Theatre the previous month as a loyal retort to the proclamation of the Young Pretender at Edinburgh. In a slightly differing form it was concurrently sung at Covent Garden Theatre. But it is stated that Latin words were sung to the tune as early as 1688, and were preserved as a Jacobite hymn. The tune was possibly an adaptation by Dr. John Bull (1562-1623), first Gresham professor of music, of a traditional air.

Haydn's admiration of the anthem inspired him to compose his own Emperor's Hymn as a national anthem for Austria. Beethoven, Weber, Brahms, and other composers have introduced



God Save the King. Facsimile of the opening bars in Dr. Arne's arrangement as sung at Drury Lane Theatre, 1745

the tune into works of their own. The same tune is used as a setting for patriotic words in many countries besides the British. In the U.S.A., under the name America, it is used for the song My Country, 'tis of Thee.

The present British words (*not* by Henry Carey, as often stated) are little more than an undistinguished sequence of loyal clichés. The second verse, which prays for the confusion of the king's enemies, has sometimes offended religious susceptibilities, but suggested alternative versions have not proved popular.

Within the British Empire the anthem is usually played or sung on any public appearance of the king, also at the close (or, increasingly, the opening) of a public entertainment. British people customarily stand while it is played, men and women of the services standing at attention. An Army order of 1933 gave precise regulations for the playing of the anthem by military bands. *See* Galliard; National Anthem. *Consult* God Save the King, P. A. Scholes, 1942; new ed. 1954.

**Godthaab** (Dan., Good Hope). Oldest settlement in, and chief town of, the southern inspectorate of Greenland. On the S.W. shore, on a bay in Davis Strait, in lat. 64° 10' N., it has a harbour, government offices, and a seminary for Eskimo catechists. The first Danish colony in Greenland, it was founded by Hans Egede in 1721. Pop. 1,000.

**Godwin** or **GODWINE** (d. 1053). English earl. Little is known of him before the time of Canute, when he became one of the English earls. In 1020 he was earl of the West Saxons, and for fifteen years he appears to have been one of the Danish king's chief supporters. He forwarded the selection of Hardicanute as king in 1035, as in 1042 he did that of Edward the Confessor. His daughter was married to the latter king, and, with his

sons also in high positions, he was the most powerful man in the kingdom. In 1051, however, there was a serious quarrel between the earl and the king. The details are uncertain, but Godwin and his sons were exiled. In 1053, however, he returned and was restored to his estates and dignities. He died April 15, 1053. Godwin, whose name is perpetuated in the Goodwin Sands, is regarded as the protagonist of the English against the growing influence of the Normans. Harold II was one of his sons: others were Sweyn, Tostig, Gurth, and Leofwine.

**Godwin, MARY WOLLSTONECRAFT** (1759-97). English writer, and advocate of women's rights.



Mary Wollstonecraft Godwin, British feminist  
After Ople

Born at Hoxton, London, April 27, 1759, daughter of Edward John Wollstonecraft, she lived at Epping and Beverley, Yorkshire. Here she received the principal part of her education. She left an uncongenial home in 1778, and became companion to a Mrs. Dawson, at Bath. In 1783, with a Miss Blood, she opened a school at Islington, later removed to Newington Green. She was for a year governess in the family of Lord Kingsborough, but in 1787 was offered the chance to adopt a literary career by the London publisher, Johnson, who, in 1786, had given her 10gs. for a pamphlet entitled *Thoughts on the Education of Daughters*. She contributed regularly to *The Analytical Review*; translated Salzmann's *Elements of Morality*; in 1791 published her *Vindication of the Rights of Men*, an answer to Burke's *Reflections on the French Revolution*; and in 1792 issued her *Vindication of the Rights of*

Woman, her most famous work, dedicated to Talleyrand.

In Paris, where she witnessed the Terror and collected materials for her unfinished work on the Revolution, 1794, she met Gilbert Imlay, and bore him a daughter, Fanny, 1794 (who committed suicide in 1816). She tried to drown herself from Putney Bridge as a result of Imlay's desertion; married William Godwin (*v.i.*), March 29, 1797; and on Aug. 30 in the same year bore him a daughter, Mary, who became the second wife of the poet Shelley. She died Sept. 10, 1797. *Consult* Memoir, W. Godwin, 1798; Life, Mrs. E. R. Pennell, 1885; Love Letters of Mary Wollstonecraft to Gilbert Imlay, intro. R. Ingpen, 1908; Mary Wollstonecraft, M. Linford, 1924.

**Godwin, WILLIAM** (1756-1836). English political writer and novelist. Born at Wisbech, Cambridgeshire, March 3, 1756, for some years he was a dissenting minister. In 1785 he became a freethinker and a republican, and in 1793 obtained considerable reputation by the publication of his *Enquiry concerning Political Justice*, a gospel of the purest anarchism. In 1794 he brought out *The Adventures of*

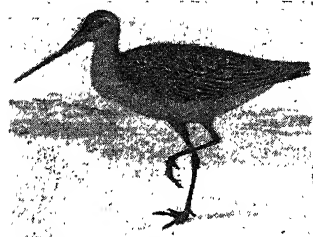


William Godwin  
After J. Northcote, R.A.

Caleb Williams, a novel of extraordinary power, wherein he presented Falkland, the first of his self-torturing and unfortunate heroes. On these two books his contemporary fame was based; he is remembered by posterity principally as the father-in-law of Shelley. He died April 7, 1836. *Consult* Shelley, Godwin and their Circle, H. N. Brailsford, 1913; Lives, F. K. Brown, 1926, G. Woodcock, 1947.

**Godwin-Austen.** Lofty mt. of Central Asia, the second highest known peak in the world (28,278 ft.). It is situated on the N.E. frontier of Kashmir, and is the culminating point of the Mustagh or Karakoram range. Designated on the India survey maps as "K 2," it was also called Dapsang. It was named Godwin-Austen in 1888, after Lt.-Col. H. H. Godwin-Austen, of the Survey of India. An Italian expedition scaled it, 1954.

**Godwit** (*Limosa*). Genus of wading birds belonging to the snipe group. Two species, the bar-tailed (*L. lapponica*) and the black-tailed (*L. limosa*) godwits, occur in Great Britain as birds of passage, though they appear to breed there no longer. They have long



Godwit. The black-tailed variety, *Limosa limosa*

legs and beaks, the plumage barred with white and brown, and are usually found about shores and estuaries.

**Goebbels, PAUL JOSEF** (1897–1945). German Nazi leader. He was born Oct. 29, 1897, at Rheydt, an industrial town on the Rhine. His father, a clerk, died when Goebbels was a boy, and his mother, a staunch R.C., was aided in his education by a church charity and by a Jewish philanthropist.

He proved a brilliant scholar, though his dwarfish figure and club foot had a warping effect on his mind. He studied literature under Dr. Gundolf, a German teacher of Jewish origin, and might have made a successful career for himself as a writer. He chose instead to devote himself to National Socialism. Though not one of the earliest members of the party, his perverted invention and resourcefulness, and his gift for persuading simpler minds and turning doubt into enthusiasm were quickly rewarded. In 1926 Hitler appointed him *Gauleiter* for Berlin, where he immediately started an evening paper, *Der Angriff*, devoted to the overthrow of the Weimar republic. This met with such success, despite its unscrupulous methods, that in

1929 he was put in charge of Nazi party propaganda.

After Hitler's accession to power Goebbels created a ministry of



Josef Goebbels, German Nazi leader

propaganda, and was generally recognized as the intellectual leader of the Nazis. Throughout the Second Great War his articles and speeches, an inextricable mixture of lies and distortion with a minimum of actual fact, did much to sustain German resistance and stimulate German morale. His craving for applause, no less than awareness of the fate in store for a prisoner numbered among the most guilty of war criminals, helps to explain his melodramatic death. He seems to have survived Hitler, whose body, it was believed, he helped to carry to its improvised funeral pyre. He took his own life, as well as the lives of his wife and seven children, shortly before the fall of Berlin to the Russians on May 2, 1945.

**Goeben.** German battle cruiser, built 1911. She became notable early in the First Great War by her escape into Turkish waters from the British Mediterranean fleet in company with the Breslau (*q.v.*), Aug. 6, 1914, and her subsequent operations while leading the Turkish fleet in the Dardanelles. On Jan. 20, 1918, the two ships, emerging from the Dardanelles to attack British ships in the Aegean area, were driven into minefields. The Breslau sank and the Goeben suffered much damage, which was increased by bombs from British aircraft while she was under repair. After the armistice the British fleet, on entering the Sea of Marmara, found her completely crippled at Ismid and took her over.

**Goering, HERMANN WILHELM** (1893–1946). German airman and Nazi leader. Born Jan. 12, 1893, at Rosenheim in Bavaria, the son of Judge Goering, a former commissioner for S.W. Africa, he served during the First Great War in the famous Richt-hofen squadron (*q.v.*), winning the order Pour le Mérite. When imperial Germany



Hermann Goering, German Nazi leader

collapsed in 1918 he conceived a violent hatred for the socialism that replaced it and went to Sweden as a civil air pilot.

On his return to Germany in 1922 he met Hitler and offered him his services. He was one of the first 12 Nazi deputies elected to the Reichstag in 1928, founded the S.A. (brown shirt storm troops), and by his ruthlessness and organizing ability was probably more responsible than anyone else for the consolidation of the Nazis in power in 1933. He created the Gestapo (*q.v.*) and the concentration camps, used the Reichstag fire (*q.v.*) as a pretext for destroying his political opponents, and was behind the "Roehm Putsch" (*q.v.*) (June, 1934) which wiped out dissident members of the Nazi party itself.

As Reich minister for air from 1933, he organized the Luftwaffe for war (using it experimentally in the Spanish civil war, 1936–39). Made c.-in-c. of the Luftwaffe, 1935, he became director of the four-year-plan, 1936, field marshal, 1938, and when war started was made head of the Reich defence council. Hitler's designated successor from Sept., 1939, he fell out of favour in the last months of the war, was deprived of his offices and of the succession, and expelled from the Nazi party.

He was captured by U.S. troops near Salzburg on May 8, 1945. Brought to trial before the international military tribunal at Nuremberg in Nov., 1945, he made, March 13–15, 1946, an unexpectedly dignified statement in his own defence. Found guilty on all four counts in the charge—conspiracy to wage aggressive war, crimes against peace, war crimes, and crimes against humanity—he was, on Oct. 1, condemned to death by hanging. He escaped this fate by committing suicide by poison on the night of Oct. 15, 2½ hours before the time set for his execution.

**Goes or TER GOES.** Town of the island of S. Beveland, Netherlands, in the prov. of Zeeland. It is situated in the N. part of the island, of which it is the chief town. 20 m. W.N.W. of Bergen-op-Zoom. It has a lofty Gothic church, consecrated in 1423, and remnants of the château of Ostende, once the residence of the Countess Jaqueline of Bavaria. The town hall contains fine pictures by Flemish artists. Goes suffered some damage during the Second Great War, being liberated by British forces, Oct. 29, 1944, in the course of the operations to force the Scheldt estuary.

At the weekly fair some of the men and women wear the traditional costumes of the surrounding districts.

**Goethals**, GEORGE WASHINGTON (1858-1928). American soldier and engineer. Born at Brooklyn and educated at the military academy of West Point, he specialised in military engineering, and did good service in that branch in the Spanish-American War of 1898. He was also employed on weir and harbour work. In 1907 Goethals was given charge of the construction of the Panama

Canal, a task demanding not only technical skill but high administrative qualities, which he fulfilled with admirable success, the canal being virtually completed some six months before the scheduled date of June 1, 1915. In Dec., 1917, he was acting Q.M.G. He died Jan. 21, 1928.



G. W. Goethals, American soldier  
He died Jan. 21, 1928.

## GOETHE: HIS CAREER AND INFLUENCE

J. G. Robertson, former Prof. of German Literature, London Univ

*This article is supplemented by those on Germany: Literature; Drama; Poetry. See also the biographies of Heine; Schiller, and other German poets*

Johann Wolfgang von Goethe, Germany's greatest poet, was born at Frankfort-on-Main, Aug. 28, 1749. Of good family, he received a liberal education at the hands of tutors, and studied law at the university of Leipzig and subsequently at Strasbourg. In the latter town, under the guidance of Herder, he learned to appreciate the beauties of Gothic architecture, the German Volkslied, and the greatness of Shakespeare; his genius was thereby awakened, and under the influence of his love for Friederike Brion, daughter of the pastor of a neighbouring Alsatian village, his lyric powers revealed their full strength. With Götz von Berlichingen, 1773, Goethe gave the new literary movement of Storm and Stress its first tragedy, and with Werthers Leiden, 1774, its typical novel. To this period also belongs the drama Clavigo, 1774, and other fragmentary works, including the earliest form of the drama of Faust.

### Goethe and Weimar

Before settling down as an advocate in Frankfort, Goethe spent some months at Wetzlar, then the seat of the supreme German law courts. His plans for a career were, however, soon upset; at the end of 1775 he accepted an invitation to visit Karl August, duke of Saxe-Weimar, and Weimar remained his home for life. He won the duke's confidence, and before long was entrusted, as his minister, with the conduct of state affairs. These duties and the claims of social life interfered for a time with his literary work, and he published little; but under the inspiration of Charlotte von Stein, whose influence is immediately apparent in his lyrics, all the greater works of the next twenty years of his life were planned and begun.

The years 1786-88 Goethe spent in Italy, a stay which made a deep incision in his literary life; in the course of these years the dramas of Iphigenie auf Tauris, 1787, and Egmont, 1788, were completed, and Torquato Tasso, 1790, in great part written. On his return to Germany disappointment with home conditions for a time lamed his powers, and he produced little of importance; but in 1794 he came into personal contact with Schiller, and a mutually inspiring affection united the two men until the younger poet's death in 1805. In this period Goethe completed his



After J. K. Stieler

greatest novel, Wilhelm Meisters Lehrjahre, 1795-96, and, in friendly rivalry with Schiller, wrote several of his finest ballads. In 1797 he published Hermann und Dorothea, the most perfect idyll in German literature.

Goethe also threw himself zealously into scientific pursuits. Here

his discovery of a rudimentary inter-maxillary bone in man and his suggestive theory of plant-development from the basic leaf-form prepared the way for the Darwinian theory of evolution, while his studies in optics resulted in a new theory of colours. The last period of Goethe's life is comparatively uneventful. In 1788 he had found a congenial helpmate in Christiane Vulpius, who, although of all the women Goethe loved least to be regarded as his intellectual equal, inspired a lasting affection; in 1806 he made her his wife.

His principal works in this period were the first part of Faust, 1808; Die Wahlverwandtschaften, 1809, a psychological "problem" novel; Der Westöstliche Divan, 1819, a collection of poetry in an oriental mould which showed that, in spite of his years, his lyric powers were still undiminished; and Wilhelm Meisters Wanderjahre, 1821, a continuation of the earlier novel. In 1811 he commenced the publication of his autobiography, Aus meinem Leben: Dichtung und Wahrheit, which, however, was not carried beyond the year 1775, although other works, such as Die Italienische Reise, 1816, etc., may be regarded as a continuation.

In the very last year of his life he put the finishing touches to the second part of Faust, 1832. As his interest in this theme went back to the very beginnings of his literary life, and the kernel of the first part, the tragedy of Faust and Gretchen, was written in his pre-Weimar days, Faust may be said, in a very literal sense, to have accompanied Goethe all through life. He died at Weimar, March 22, 1832.

### Goethe's Place in Literature

It is difficult in a brief summary to estimate Goethe's significance for his own literature and that of Europe. The most striking features in his life are the universality of his genius, the enormous range of his intellectual sympathies, and the sincerity and sanity of his judgement of men and things. He was not tempted into false paths by the materialistic tendencies of the age of rationalism into which he was born, nor did he lose himself in the maze of metaphysical subtleties of the romantic epoch.

His supreme achievement, it has been often said, was the life he lived; supreme, not on account of any exemplary morality, but rather because he saw all his experience in the light of a moral education, as so much material out of which he might build up, as he said, the pyramid of his life and personality.



Goethe. House in Weimar presented to the poet in 1792 by Karl August, duke of Saxe-Weimar. Drawn by D. Wagner, engraved by L. Schütze

His works he has himself called "fragments of a great confession," the "confession" of his own life; and this markedly subjective aspect lends them a unique interest.

But Goethe was also a great artist in poetry. It is true, his strength, unless where the lyric was concerned, did not lie in formal beauty; his dramas often overstep the limitations imposed by the theatre; his novels are lacking in proportion and sometimes tedious. But both his dramas and his novels show an almost Shakespearean power of characterisation, an insight into problems of spiritual development and emotional conflict, and contain an unrivalled wealth of wise reflection. As a lyric poet, Goethe stands alone in a literature the strength of which has in all times lain in its lyric. In the problems of philosophy, on the other hand, he took little interest: as a political thinker, he lived in too distraught an age to understand fully the questions either of his own time or of the future; as a scientist, his achievements have no present-day value. But his attitude to the problem of the conduct of life is still "modern." Goethe's life covered the most important period in the development of his country's literature, and he is its greatest personality.

Round few men of letters has so vast a literature grown up. The standard Weimar edition in 142 vols., 1887-1920, includes Works, Letters, and Diaries. Goethe's Conversations have been edited by F. Biedermann, 2nd ed. 1908-09. The first adequate biography in English was by G.H. Lewes, 1855. In German the most satisfactory Life is by A. Bielschowsky, Eng. trans. W. A. Cooper, 1905-08. There is a complete bibliography in Goedeke's *Grundriss zur Geschichte der deutschen Dichtung*, vol. iv., 1910. Consult also Life,

J. Sims, 1888; G. and the Twentieth Century, J. G. Robertson, 1912; Life, P. Hume Brown, 1920; Life, J. G. Robertson, 1927; G., the History of a Man, E. Ludwig, 1928; G. Man and Poet, H. W. Nevins, 1931; Letters, English translation, 1957.

**Goethite.** Iron ore, one of the most common minerals, and, after haematite, the commonest

ferric oxide. Much of what was formerly called limonite, is really goethite. It generally occurs as yellowish or reddish brown masses with a fibrous structure. It is a hydrogen iron oxide ( $\text{HFeO}_2$ , 90 p.c. iron) often containing up to 5 p.c. manganese, admixed silica, and adsorbed water. Goethite is typically formed under oxidising conditions as a weathering product of ferri-ferous minerals; in bogs and springs; with limonite in gossan; in residual deposits (laterites) of igneous and other rocks. Goethite is mined in Germany, Bohemia, and France; common in the Lake Superior haematite deposits; residual after glauconitic sediments in Texas, and in residual brown iron ores in the Appalachians.

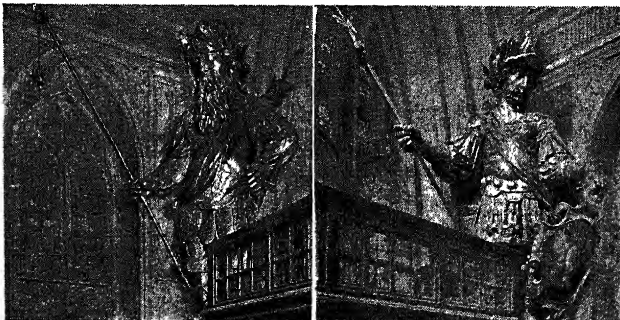
**Gog and Magog.** Two names in Biblical and post-Biblical literature. In Ezek. 38, v. 2, God is spoken of as opposing "Gog, the land of Magog, the prince of Rosh, Meshech and Tubal"; and in Chap. 39 a battle on the mountains of Israel is predicted in which Gog is overthrown. In the Mishnah, Gog and Magog appear as the worldly leaders of a furious assault upon the Kingdom of God. The name Gog was perhaps suggested by the Gyges

of Herodotus and the Gugu of Assyrian inscriptions.

Two wooden figures called Gog and Magog, 14 ft. 6 ins. high, and carved in 1708 by Richard Saunders for a sum of £70, stood on octagonal pedestals at the west end of Guildhall, City of London. Destroyed in 1940 by enemy bombing, they were replaced by new figures unveiled in 1953.

Figures of this character, but made of wickerwork and pasteboard, were at one time carried in the annual mayoral procession. According to tradition they represent Gogmagog and Corineus, who, in medieval monastic chronicles, fought the battles of the Trojan invaders against the early inhabitants of Britain. In time Corineus was forgotten and the name of his companion divided between the two. With this myth is associated the tradition that the city was founded by the invaders and that London as Troynovaunt, or New Troy, was the chief city of Albion 1,000 years before the Christian era. See Gogmagog Hills.

**Gogh, VINCENT VAN** (1853-1890). Dutch painter. Son of a Calvinist pastor, he was born at Groot-Zundert, N. Brabant, March 3, 1853. At 16 he became assistant at The Hague branch of Goupil Galleries under his uncle, and later worked at the London and Paris branches. Unfitted for commercial life, he became engrossed in the ideal of Christian communism, and, returning from England in 1877, went as missionary to Belgium, where he lived in the mining village of Wasmes in the Borinage. Here he began to paint, receiving instruction from Mauve at The Hague in 1880. He returned to Brabant in 1885, and to this period belongs his first important picture, *The Potato Eaters*, a study of peasants at table. The following year in Paris he met leaders of the Impressionists and



Gog and Magog, wooden figures (destroyed in 1940) within Guildhall, London. London Stereoscopic Co.

Neo-Impressionists and was strongly influenced by their use of colour, notably by Seurat's pointillism.

In 1888 he settled at Arles, where he was joined by Gauguin. Van Gogh painted many landscapes and portraits at Arles; but, undermined by privation, and strained by exposure to the sun, his supersensitive temperament was shattered by Gauguin's overbearing personality. He had attacks of insanity, during one of which he cut off his left ear (the self-portrait mirrors this as the right ear). After being confined in an asylum at St. Rémy, he shot himself, and died July 29, 1890.

As a painter, van Gogh exemplifies the solitary genius whose art cannot be appreciated or understood by his contemporaries. His work may be divided into three stages: the early pictures of Dutch and Belgian peasants, the impressionistic phase in Paris, and the frenzied, brilliant compositions executed in Provence—among them his famous sunflowers, flowering orchards, and rhythmic patterns of cypresses and cornfields. A film, *Lust for Life*, based on van Gogh's life, with colour reproductions of many of his paintings, was released in 1957.

**Bibliography.** Lives, M. Denis, 1909; T. Duet, 1916; J. Meier-Graefe, 1928; A. Bertram, 1930; P. Burra, 1934; Letters of V. van G. to his Brother (2 vols.), 1927; *Lust for Life*, I. Stone, 1935.

**Gogmagog Hills.** Range of hills in Cambridgeshire, S.E. of Cambridge, a continuation of the chalk formation which runs up from the Chilterns. Their highest points are only about 220 ft. above sea level, but command extensive views. Traces of prehistoric earthworks exist.

**Gogol, NIKOLAI VASSILEVITCH** (1809-52). Russian novelist and dramatist. Born at Sorochintsi,

Poltava, March 13, 1809, and educated at Nyejin, he went to St. Petersburg in 1828, and for a time was a clerk in a government office. After a period of indecision and unrest, he



Nikolai V. Gogol,  
Russian novelist

published anonymously *Evenings at a Farmhouse near Dikanka*, 1831, a series of stories of that Little Russia in which his early life had been spent. For a short time he was professor of history at St. Petersburg,



Van Gogh. Self portrait of this 19th century Dutch painter, after he had cut off his ear  
Courtauld Collection

In 1834 Mirgorod, another volume of stories, established his fame; it contained Taras Bulba, a romance of the Cossacks, which was re-written in 1842 and, since widely translated, founded the Russian novel. In 1836 his comedy *Revizor* was produced, its satire on the conditions of the Russian life passing unnoticed in general appreciation of its humour. Regarded as the greatest Russian comedy, it was given by the Incorporated Stage Society at the Scala Theatre, London, 1906. In 1920, as The Government Inspector, it was produced at the Duke of York's Theatre. During 1836-48 the author lived mostly in Rome. In 1842 he published the first volume of *Dead Souls*, presenting Russian provincial life in a clear and brilliant manner, and with a rare humour. The second volume was burnt by the author, and only collected scraps have been produced. In his later years Gogol developed religious mania, and died at Moscow, worn out, it is said, by prayer and fasting, Feb. 21, 1852. *Consult* Complete works. Eng. trans. Constance Garnett, 1922, etc.; Lives, L. Leger, 1914; J. Lavrin, 1926; D. Magarshack, 1957.

**Goias.** See Goyaz.

**Gogra.** River of India. With its source in Tibet, it runs through the Uttar Union in a S.E. direction and joins the Ganges at Chapra. It exceeds 500 m. in length, is venerated by the Hindus, and is a useful waterway.

**Goidels.** One branch of the Celtic-speaking peoples who carried to Ireland and Scotland the Goidelic or Q-Celtic speech. This developed into Irish and Scottish Gaelic and the Manx dialect. The other branch of the Celtic-speaking peoples brought the Brythonic or

P-Celtic dialects into southern England and Wales. Both the Goidelic and the Brythonic invasions of the British Isles were probably associated with the expansion of the Iron Age La Tène culture about the 4th century B.C. The Goidelic invaders were a small ruling aristocracy of Alpine stock, who came from western France. In the western British Isles they imposed their language and culture on the indigenous peoples of Mediterranean stock, with whom they rapidly became merged.

**Goil.** Sea-loch of Argyllshire, Scotland. It forms a W. arm of Loch Long, and extends for 6 m. N.W. of Lochgoilhead.

**Goito.** Town of Italy. It is 11 m. W. of Mantua, and is chiefly notable for the battle fought here on May 30, 1848, when Charles Albert, king of Sardinia, defeated the Austrians. Pop. (1951) 9,562.

**Goitre** (Fr. *goitre*, Lat. *guttur*, throat). An enlargement of the thyroid gland, situated in the lower part of the front of the neck. The size of a gland is no indication of its functioning capacity. Goitre falls into two main subdivisions: the secretion of the gland is diminished by excess of formation of non-glandular tissue, and the enlargement is an effort at compensation of function; or there is an enlargement of the intrinsic tissue with increased or toxic output of secretion. If the output of the gland is too small for the health of the organism, myxoedema may result with increase in weight, loss of intelligence, dropping out of hair; if too large, the result is exophthalmic goitre, characterised mainly by protruding eyeballs, quick pulse rate, tremor of the outstretched hands: this is also known as Graves's disease. Alternatively, enlargement of the gland may be due to tumour, either simple or malignant in nature.

Goitre is most common where iodine, a necessary component of the secretion of the thyroid, is scarce or absent. It is often seen in areas remote from the sea, e.g. Switzerland, Central India, Derbyshire (whence its name Derby neck). Treatment depends upon careful weighing up of the case. To provide the chemical substances lacking may achieve the cure; if surgery is indicated the operation is safe, the scar negligible. *See* Exophthalmic Goitre; Myxoedema.

**Gojjam.** District of Abyssinia. A grassy plain traversed by high mt. ranges, it lies to the S. of Lake Tana, between lat. 10° and 11° N.



Never entirely subdued by the Italians during their occupation of Abyssinia (1936-41), Gojjam became a centre of revolt in the early months of 1941, when some 1,600 Sudanese and Abyssinian troops, led by British officers, cleared much larger Italian forces from Gojjam in six weeks. See East Africa Campaign.

**Gokcha** OK SEVAN. Lake of Armenia S.S.R. It lies at an alt. of over 6,000 ft., 30 m. E.N.E. of Erivan, in a deep basin surrounded by rugged mts. It is about 47 m. long from N.W. to S.E., with an average breadth of 12 m., and provides good fishing.

**Golconda.** Fortress belonging to the nizams of Hyderabad, India. Situated about 7 m. W. of Hyderabad, Golconda, now a ruined city, was the capital of a kingdom that flourished from its establishment in 1512 until its conquest and annexation by Aurangzebe in 1687. Huge mausoleums of the former kings, fast falling into decay, surround and dominate the fort, which was used by the nizams as a treasury and prison. From the fact that the diamonds brought from the rich fields at the base of the Nila Hulla mts. were cut and sold at Golconda, the name of the city has come to be associated with fabulous wealth.

copper, iron, rarely bismuth, tin, lead, zinc, platinum, palladium, iridium, rhodium.

Native gold crystallises in the isometric system, often as octahedral crystals, but more commonly as irregular grains or in wiry dendritic forms. Other properties are (1) no cleavage; (2) high specific gravity—19.3; (3) softness, malleability, ductility; (4) opaqueness, though it is translucent-green in thin foliae.

In nature gold combines only with other metals, and of these tellurium (Te) is the most common. The gold tellurides usually contain variable amounts of silver, up to 5 p.c. The most common is calaverite ( $\text{Au}_2\text{Te}_3$ , 43.6 p.c. gold). Krennerite ( $\text{Au}_8\text{Te}_{16}$ , also 43.6 p.c. gold) is rarer than calaverite or sylvanite. Sylvanite ( $\text{Au}_2\text{Ag}_2\text{Te}_8$ , 24.2 p.c. gold) and petzite ( $\text{Ag}_3\text{AuTe}_2$ , 25.4 p.c. gold) are gold-silver tellurides. Gold telluride ores form important sources of gold in a certain class of deposit (see below). Occasionally gold may combine with selenium and bismuth. In a few deposits gold and mercury form a natural amalgam.

#### Where Gold is Found

Gold is widespread in the earth's crust. It is found in small amounts in all igneous rocks, in sea water, and in some hot springs. It is also found in sedimentary rocks formed as a result of erosion of igneous rocks. The order of concentration is 6 parts per million.

Small amounts of metallic gold are commonly present in other minerals, especially in pyrite, chalcopyrite, sphalerite, galena, and other sulphides, occasionally in sufficient amount to form an economic source of the metal. Deposits of native gold are usually in veins, the most important economically; with quartz in quartz veins; and, in small amounts, with quartz and feldspar in pegmatite dykes. The wall-rock of the veins is sometimes replaced by gold, pyrite, sericite, alunite, etc.—the particular mineral assemblage depends on the nature of the rock, the conditions at the time of formation, and the composition of the ore-forming solutions. The gold tellurides occur in similar siliceous veins.

Occasionally gold ore occurs in contact-altered sedimentary rocks adjoining an acid igneous rock. Such deposits (e.g. in Montana) are called pyrometasomatic deposits. Gold is found in notable amounts in two main types of deposit: (a) in veins of hydrothermal and

## GOLD: THE METAL AND ITS USES

F. D. L. Noakes, B.Sc., and J. Stuart Webb, B.Sc.

*Treasured for its appearance, its ease of working, and its resistance to corrosion, gold has played a vital part in the development of man's history. Its distribution, methods of recovery, and uses are here described. See Exchange; Gold Standard*

Pure gold is a yellow metal in the solid state, but it appears green when molten and red or purple when finely divided. The element, chemical symbol Au, falls into the first group of the Periodic Table, with silver and copper, and has one free valency electron. It has the following physical properties: atomic number, 79; atomic weight, 197.2; melting point,  $1,063^\circ\text{C}$ .; boiling point,  $2,600^\circ\text{C}$ .; crystal form, face-centred cube, with lattice constant  $a=4.0779$  at  $18^\circ\text{C}$ .; density, 19.32, as cast, but this can be increased by hammering to 19.65, and the density of precipitated gold may be as high as 20.5; electrical resistivity, 2.44 microhms per centimetre cube at  $18^\circ\text{C}$ .

Gold was almost certainly the first metal to be worked by man, since it occurs more widely than any other in the native state, and its fascinating colour and great weight attracted early man, probably even before the beginnings of civilization. From very early times it has been associated with wealth, and hence with the conflicts of nations. The grains of gold, varying in shape and size, were at first merely tied together with pieces of animal fibre to form bracelets and necklaces, but before long the amenability of the metal to working into shapes by hammering became apparent, and later it was found possible to melt and cast it into moulds. Owing to the excellent resistance to corrosion of this "noble" metal, many examples of the work of early artists on

flints, knives, and other implements exist to this day in very much their original form.

The working of gold is mentioned in the Old Testament and the ancient Egyptians have left us many beautiful articles of jewelry and statuettes, dating as far back as 5,000 B.C., the First Dynasty. The Greeks later developed great skill in handling gold, and much of their early history and way of life have been learned from a study of their ornaments.

Methods of separating metallic gold from the associated rocks and minerals have been developed from very early times, and gold-working is depicted on monuments of the Fourth Dynasty (4,000 B.C.). The methods of extraction used had much in common with modern practice, and there is evidence to show that gold was refined by cupellation before 500 B.C., and was recovered by amalgamation before the Christian era. The first full description of the metallurgy of gold is to be found in Georgius Agricola's *De Re Metallica*, 1556. His illustrations show strakes, mortars, and stamps very similar to those still used in some mines.

#### Native Gold

Most of the world's gold is still obtained in the metallic state, i.e. native gold. On rare occasions it is almost pure (Au), but generally it contains up to 10-15 p.c. of silver (Ag). When it contains more than 20 p.c. of silver, the mineral is known as electrum. Depending on the silver content, the colour varies from gold-yellow to silver-white. Other impurities sometimes present are

related origin, connected with igneous activity; and (b) as placer deposits derived from the former by weathering processes at the surface, which remove the light minerals and leave gold and other heavy stable minerals concentrated near the outcrop of the source.

The great majority of gold lodes or veins are found within a mile of the acid intrusive rock with which they are genetically related. As a rule, hydrothermal siliceous solutions, ascending from below, favour channelways near cupolas (*q.v.*) or small stocks of the igneous mass. These solutions deposit quartz, gold, and other minerals to form the auriferous quartz veins. According to the temperature and pressure at the time of formation, the veins assume certain characteristic features, and the vein-type has a very important bearing on the life of the mine.

#### World's Greatest Gold Mines

The deposits formed at the highest temperatures and pressures (hypothermal deposits, *q.v.*) are composed of massive quartz with gold, pyrite, pyrrhotite, and other sulphides, occasionally some tellurides, garnet, biotite, amphibole, or tourmaline. Such deposits compose some of the greatest gold mines in the world, *e.g.* Porcupine and Kirkland Lake, Canada; Morro Velho, Brazil; Kolar, India; Kalgoorlie, Australia. Hypothermal gold deposits are characterised by persistent, deep veins, workable in places to a depth of more than 8,000 ft.

The famous Mother Lode, California, and Bendigo, Australia, deposits were formed from similar solutions under intermediate conditions. These mesothermal deposits (*q.v.*) are composed of gold in milky quartz, simple auriferous sulphides, and, locally, albite and chlorite. The vein minerals are usually massive and rarely show comb structure. Carbonates and sericite may appear in the wall-rocks.

Deposition under low temperatures and pressures (epithermal deposits, *q.v.*) is shown by delicate banding in the quartz vein, complex sulphides and sulph-arsenides, and low temperature minerals such as zeolites, lamellae calcite, etc. At places gold tellurides form the bulk of the ore. Epithermal gold deposits are frequently extraordinarily rich, but they have little depth. Examples of this type of deposit are El Oro, Mexico; Comstock, Nevada; Cripple Creek, Colorado (telluride ore).

Until recent years, placer deposits were the chief sources of the world's gold, yielding about 20 p.c. of the total metal mined. The richest values in such deposits are usually found near the bedrock, and the gold, often very pure, occurs in grains ranging from mere "colours" up to large nuggets, some weighing over 200 lb.

Famous localities include Klondike, Yukon; Ballarat, Australia; and California. Not all placer deposits occur on the surface. Some were formed during early geological times, and have since been covered by newer sedimentary or even igneous rocks such as lavas (California, and Victoria, Australia). The origin of the famous Rand gold deposits, S. Africa (*see* Witwatersrand) is still a matter of controversy. Some believe that the lodes of this, the largest mining field in the world, were originally surface placers, subsequently covered by later sediments and folded into a large synclinal basin. Such deposits are known as "fossil placers." Others maintain that the Rand deposits were formed in a similar manner to the vein deposits.

Gold placers also accumulate along sea-shores in mineralised areas, forming beach or marine placers. In such places as Nome, Alaska, wave and current action have selectively concentrated detrital gold on the present-day beaches and also in earlier "raised beaches."

#### How Gold is Extracted

Methods of extraction vary with the mode of occurrence of the ore, its richness, and the quality and quantity present of other constituents which influence the process. When the gold is concentrated in placer deposits, the process is simplified to a gravity concentration of the heavy particles of gold, the ore often consisting of loose particles which require little or no crushing. Various apparatus is used in washing the gravel. The pan, of the same form as that used by the old prospectors, is a flat-bottomed bowl of stiff sheet-iron, 2½ to 3½ inches deep and about 8 to 10 inches in diameter at the bottom. The sides may be rifled to help the collection of fine particles of gold. The pan is given a swirling motion, so that the water carries the gangue material over the side and leaves the heavy gold in a "tail" in the bottom of the pan. The operation looks simple, but requires practice. With the batea, which is made of wood and

conical instead of flat-bottomed, the gold is collected in the bottom of the cone. Mechanical bateas, the long tom and the Siberian trough (long troughs with riffles at suitable places to hold back the gold), and sluice boxes are all used to obtain a concentrate of gold and black sand which can be treated by amalgamation for recovery of the gold. The amalgamation is carried out in barrels or in some form of mill, the mercury-gold amalgam being collected on plates or strakes. The mercury is distilled off in a retort leaving the precious metals, and the tailings are treated with cyanide to recover any remaining gold. On the large scale, the sands are lifted from a river bed by dredgers or washed from the rock hydraulically by a very powerful jet of water, the proceeds being passed over suitable sluices.

#### Stamp Batteries

When the alluvial deposits have been worked out and it becomes necessary to mine the gold from the hard rock, this must be crushed to such a fineness that all or most of the gold is liberated, the final size being decided by economic considerations. If the bulk of the gold is liberated by fairly fine crushing, it may not pay to introduce fine-crushing plant to extract the small amount of gold remaining in the ore. Coarse crushing was long carried out by stamp batteries, first used early in the 15th century. A series of heavy stamps is raised by cams on a rotating shaft and then dropped on to the ore, held in a mortar box. Usually water is added, and the pulp flows over either an amalgamation plate or corduroy strakes, which collect most of the coarse gold in the valleys of the corduroy. Stamp batteries continued in use at some mines where it would be uneconomical to scrap old plant, after the introduction elsewhere of rock breakers of the Blake moving jaw type and the Symons cone crusher, which has a gyratory motion.

Ores containing only 2½ to 8 pennyweights of gold per ton, and tailings containing similar small amounts, could not be worked economically until the introduction of the cyanide process (*q.v.*) on the Rand, S. Africa, in 1890 and at about the same time in New Zealand. This process depends on the fact that gold and silver are readily soluble in dilute solutions of potassium cyanide. For the process to be effective, the

ore must be crushed more finely than before, and for this various types of rod mill and ball mill are used. The pulp from these can then either be classified to give fine material or "sands" and very fine material or "slimes," or it can all be ground to slimes. Details of methods used are described under Mineral Dressing. Sands are usually treated by some form of gravity concentration in classifiers, vanners, or vibrating tables. The concentrates can then be treated with mercury in an amalgamation barrel.

Sands separated from the slimes by settling are cyanided in large vats, made of concrete or mild steel, and holding up to 1,000 tons each. The vats have false bottoms so that suction can be applied by means of pumps. They are nearly filled with sands, and then strong cyanide solution, containing 0.05 to 0.10 and rarely up to 0.5 p.c. of potassium cyanide, is run on top. The solution is then sucked through. The process is repeated several times with progressively weaker solutions, until all the gold and silver, or as much as can be extracted economically, have been dissolved. The gold-bearing solution is then pumped to zinc boxes, where it comes into contact either with zinc shavings or zinc dust, which precipitates gold and silver electrochemically, so that they can be filtered off. Aluminium or charcoal may be used as alternatives to zinc. The precipitate is treated for recovery of silver.

#### Filtration of Gold Slimes

Slimes are so finely divided that they cannot be separated from the solution except by filtration under pressure. Before cyaniding, lime must be added, usually at the crushing stage, to form a protective alkali to prevent destruction of the cyanides by acids, formed from the various constituents of the ore, such as sulphides. The slime is then submitted to the action of the cyanide either by decantation or, more commonly, by agitation. Some excess water is removed from the slime which is then pumped to an agitator, such as the Pachuca or Brown tank. This consists of a tall cylindrical tower with some means of pumping air into the bottom, so that the slime, mixed with the cyanide solution, is simultaneously agitated and aerated. After between 3 and 24 hours' agitation the pulp is pumped out and filtered under pressure, the solids being washed with water. The auriferous solu-

tion is then passed to the zinc boxes. The barren solution after removal of the gold is not discarded, but made up to strength and recirculated until it becomes too foul for further use.

Flotation (*q.v.*) was introduced for concentrating the very fine particles of gold. The precious metal particles adhere to the froth and so become separated from the gangue. The process is particularly useful for recovering very fine particles produced inevitably during crushing and missed by gravity methods, and for the treatment of complex ores containing elements which interfere with cyaniding.

#### Purifying and Refining

The crude bullion is melted and cast into bars, which are assayed to determine the quantities of base and precious metals present (*see* Assaying). Some purification is effected during melting by the addition of nitre. Refining can be effected by the electrolytic, the sulphuric acid, or the chlorine process. Electrolysis is carried out in a gold chloride solution by a process due to Wohlwill (*q.v.*). The process is slow and necessitates a heavy "lock-up" of gold. In the sulphuric acid process, the alloy is "inquarted" with silver; that is to say, sufficient silver is added to produce an alloy from which the silver can readily be dissolved by the acid, to leave an insoluble gold residue. Acid consumption is high and the process is therefore expensive. In the Miller chlorination process, the gold is melted down and gaseous chlorine under pressure is forced through the metal. Silver and the base metals form chlorides which float to the top of the crucible as a slag that can be easily removed. When the gold contains appreciable amounts of the platinum metals, a wet chlorination process must be used.

The production of proof or fine gold is very laborious. The refined gold is dissolved in aqua regia, the excess of acid driven off by heating, and the solution, after dilution, is allowed to stand to precipitate silver chloride. After some days it is decanted, diluted, and again allowed to stand. This process is repeated until there is no further precipitation of silver chloride. The gold is then precipitated from the solution in a very fine form by sulphur dioxide, oxalic acid, or some other reducing agent.

Gold is the most malleable and ductile of all the metals and it may be beaten down to leaves less than 0.000005 inches thick (*see* Gold Leaf). It has a tensile strength of

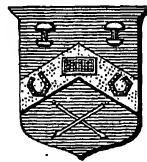
about 7 tons per sq. in. with an elongation of 30 p.c. It is not such a good conductor of heat or electricity as copper or silver, the electrical conductivity being 67, as compared with silver's 100. The metal is not attacked by hydrochloric, sulphuric, or nitric acids individually, but mixtures of hydrochloric acid with sulphuric or with nitric acid (forming aqua regia) dissolve it readily to form auric chloride. Chlor-auric acid is also formed, and this is used in photography for toning. Gold is non-corrosive and does not absorb gases by heating in air or hydrogen.

The price of gold varies, but in 1956 it was in the neighbourhood of 250s. per fine ounce. It is used mainly for jewelry, where its colour and ease of working are its chief assets. Gold is used in the form of fine suspensions in oils as liquid gold, or as potter's gold for the decoration of pottery. By varying the amounts of gold in potter's gold, which is an amalgam with mercury and certain fluxes, lustre colours, varying from red to blue, can be produced. Gold is used widely for plating articles and instruments for use under corrosive conditions. It readily forms alloys with most metals, but, apart from the amalgams already mentioned, the only ones of commercial importance are those with silver and with copper. The alloy used by the Greeks and Romans, *electrum*, contained between 15 and 35 p.c. of silver. Standard gold in England contains 83.4 parts of copper. 22 carat gold contains 22 parts of gold in 24, the other 2 parts being copper. *See* Carat.

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#### Gold and Silver Wyre Drawers' Company, THE.

A London city livery company. Incorporated in 1693, it is first mentioned in 1461. Offices, 10, Ironmonger Lane, E.C. Consult History, H. Stewart, 1891.



Gold and silver Wyre Drawers' Company arms

**Goldau.** A village of Switzerland in the canton of Schwyz. Situated between the lakes of Zug and Lowerr, 6 m. W.N.W. of Schwyz, on

the St. Gotthard rly. (Arth-Goldau station), it is a junction for Zug and Einsiedeln-Wädenswil, and the starting point of the Arth-Rigi rly. On Sept. 2, 1806, the former village of this name at the base of the Rossberg, with three other villages, was destroyed by a landslide, the track of which can be seen from the rly.

**Gold Coast.** Historic name for a stretch of coast in W. Africa, for a number of years also the name of a British colony situated between Togoland to the E. and the French territory of the Ivory Coast to the W. With Ashanti (*q.v.*) and the protected Northern Territories it forms a compact country stretching from the Gulf of Guinea to French Sudan, 480 m. from N. to S. The coast measures 334 m. The area of the colony proper was about 24,000 sq. m.; with Ashanti, the Northern Territories, and British Togoland 91,843 sq. m.; this area in 1957 became, as Ghana, the first African country to be an independent member of the British Commonwealth.

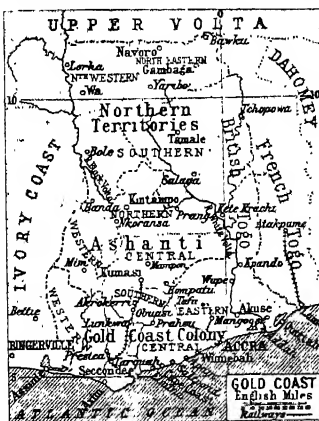
From the lagoons of the coastal regions the country rises gradually towards the interior, being crossed by numerous small streams and by one large river, the Volta. The country is inhabited by a large number of tribes, governed by their chiefs, and each more or less independent of the others.

The river-deposits of gold, from which the Gold Coast derived its name, were already worked by the natives before the advent of the Portuguese and French navigators in the 14th century. The first European settlement was made in 1482, when Fort San Jorge de Mina (Elmina) was built by the Portuguese. Subsequently other peoples, notably the Dutch, established themselves on the coast, building castles and forts, several of which still remain. English expeditions visited the Gold Coast long before the formation of the "Company of Adventurers of London trading into Africa," in 1618, but it was not until that year that English traders obtained a definite footing. Among those who established settlements were the Brandenburghers, who maintained their position during 1682-1720.

Subsequent history of the country until the English forts were definitely occupied by the British government in 1843 is that of trading companies such as the Royal African Company, 1672, the African Company of Merchants, and other private trading corporations. In 1850 the British pur-

chased the forts belonging to the Danes, and in 1871 the Dutch also transferred their possessions. In 1874 the Gold Coast was made a separate colony. Increasing responsibility devolved upon the inhabitants until under the constitution of 1951 the Gold Coast was administered by a governor with a cabinet of 11 (8 Africans, 3 Europeans) and a central legislature of 84, of whom 75 were Africans: 38 elected by universal suffrage in the colony and Ashanti, 18 by territorial councils of the colony and Ashanti, 19 by an electoral college of the Northern Territories. The country achieved independence under the name of Ghana on March 6, 1957.

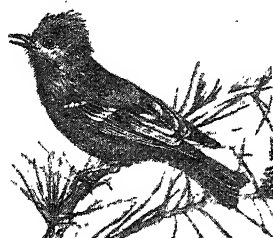
The climate of the Gold Coast, which is hot and damp, has been rendered less unhealthy by improved sanitation. The chief products are palm oil and kernels, kola nuts, rubber, cocoa, lumber, manganese ore, and gold. Such progress has been made in the



Gold Coast. The former British colony, which became independent Ghana in 1957

cocoa industry that exports far exceed in value exports of gold: in 1954, £84,598,864 compared with £9,822,320. Goldmines lie mainly in the Tarquah and Prestea districts. There are rlys. from Accra, the coastal capital, and Takoradi to Kumasi in Ashanti. Other ports are Axim and Winneba. There are aerodromes at Accra, Takoradi, Kumasi, and Tamale. Pop. (est.) 4,120,000.

**Goldcrest** (*Regulus regulus*). Smallest British bird. Though sometimes called the golden-crested wren, it is not a true wren, but is nearer to the warbler group. It is common in the pine forests in most parts of Europe, where it feeds on insects



Goldcrest. The smallest bird found in Great Britain, sometimes called the golden-crested wren

and constructs its tiny nest of moss and lichens underneath a bough. It is 3½ ins. long and has a crest of yellow feathers.

**Golden Age.** In classical mythology, the period when Saturn or Cronos, after being dethroned by Zeus, reigned in Latium as king. Saturn taught agriculture and the arts of civilization to his people, and the period of his reign was one of peace, happiness, and prosperity. Kenneth Grahame gave this title to his sketches of childhood, 1895.

**Golden Arrow.** Luxury railway service between London (Victoria) and Paris, inaugurated by the Southern railway in 1929, a special ship (Canterbury) being built for the crossing between Dover and Calais. The daily service was restored after the Second Great War, and timed to take 8½ hours. The similar service in the reverse direction is La Flèche d'Or (the arrow of gold).

**Golden Ass, THE.** Name by which The Metamorphoses of Lucius Apuleius (*q.v.*) is generally known. An allegorical fable in 11 books, much of it is a paraphrase of The Ass of Lucian, which was originally derived from the work of Lucius of Patrae, a Platonist who flourished in the reign of Marcus Aurelius.

**Golden Bough, THE.** General title for a series of studies in magic and religion by Sir James Frazer (*q.v.*), first pub. in 2 vols., 1890. In a much expanded 3rd edition (11 vols., 1907-12), the work consists of seven parts: The Magic Art; Taboo; The Dying God; Adonis, Attis, Osiris; Spirits of the Corn and of the Wild; The Scapegoat; and Balder the Beautiful. A 12th vol. is a bibliography and index. The work deals with the history of supernatural beliefs and symbolic rituals, and was inspired by a wish to inquire into the legend of the golden bough utilised by Virgil.

This legend is identified with the mistletoe, which, growing on the

oak, represents the eternal soul of a living sun-god represented by the tree. The Norse myth of Balder (*q.v.*) had its counterpart in Italy in the *rex Nemorensis*, the priest of Diana in the grove by Lake Nemi, near Aricia. Balder and the priest both personified the oak-spirit, whose life or death was in the mistletoe and who could not be slain so long as that remained intact. The priesthood was gained by one plucking the golden bough and slaying the armed priest in combat, after which the victim was burned at the midsummer fire festival and the victor assumed his place and title until in turn displaced by a stronger.

**Golden Bull** (Lat. *bullā*, knob, seal). Name given to a charter of unusual importance, sealed or stamped with a golden seal or bull. Many were issued in Germany in the Middle Ages, but the name is specially given to the document that regulated the election of the German kings from 1356 to 1806.

To end the disputes as to who were entitled to elect the kings in Germany, the emperor Charles IV ordered a bull to be drawn up, and after some alterations the princes, meeting at Metz, accepted it in Dec., 1356. Written in Latin, this Golden Bull contains 31 chapters which fix the numbers of electors at seven—the king of Bohemia, the rulers of the Palatinate, Saxony, and Brandenburg, and the archbishops of Cologne, Mainz, and Treves—and prescribe their respective precedence and duties. Frankfurt is decided upon as the seat of the elections, the regulations for the coronation are declared, and further clauses deal with such matters as the rights of the cities and of the king of Bohemia.

In general the bull greatly strengthened the power of the electors, that of the minor princes and the cities being correspondingly reduced. It remained operative until the dissolution of the Empire in 1806. Various copies are in existence in German cities, and there is an Eng. trans. in E. F. Henderson's *Select Historical Documents of the Middle Ages*. See *Electors*; *Empire*, *Holy Roman*.

**Golden Calf**. Image made by Aaron, in response to popular appeal, in the absence of Moses on the mount (Exodus 32). It was in the form of a young bull and made from earrings of gold. Divine honours were paid to it, but it is doubtful if it involved a breach of the first or the second command-

ment. Jeroboam set up similar images at both Dan and Bethel (1 Kings 12). See *Aaron*; *Idolatry*.

**Golden Eye** (*Bucephala clangula*). Wild duck found in the northern districts of both hemi-

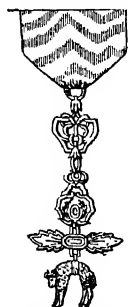


Golden Eye, a winter visitor to the British Isles

spheres. It visits Great Britain in the winter. The plumage is black on the back, with white beneath, and the drake has a bright green head. The name, derived from the yellow colour of the eye, is sometimes also applied to the tufted duck.

**Golden Fleece**. In Greek mythology, the object of the quest of Jason and the Argonauts. When Phrixus and Hellē, children of Athamas, king of Thebes, and Nephele, were about to be sacrificed, owing to the intrigues of Ino, his second wife, a ram with a golden fleece and wings appeared, and bore them away through the air. Hellē fell into the sea, but Phrixus arrived safely at Colchis, where he sacrificed the ram. Aëtes, king of the country, hung up the fleece in the sacred grove of Arēs. See *Argonauts*; *Jason*.

**Golden Fleece, ORDER OF THE**. One of the premier European orders of knighthood. It was



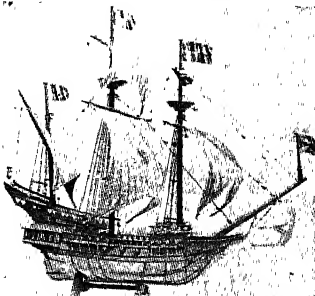
Golden Fleece. Badge of the order

founded Jan. 10, 1430, by Philip the Good, duke of Burgundy, on his marriage with Isabella of Portugal, and dedicated to the Virgin Mary and S. Andrew. Its title, recalling the voyage of the Argonauts, probably alluded to a projected crusade. The grand-mastership passed by marriage to the Hapsburgs. When the Hapsburg dynasty in Spain came to an end in 1700, it was claimed by the emperor Charles VI, who established it in Vienna in 1713. Since then the order has existed independently in both Spain and Austria.

The Austrian branch has adhered to the original limitation of membership to noblemen of R.C. faith, the single exception being George IV of England, by papal dispensation. The badge is a golden fleece suspended from a collar of alternate fire-steel and flint stones, emitting flames. For less ceremonial use it has been suspended from a red ribbon.

**Golden Gate**. Channel connecting San Francisco Bay, California, U.S.A., with the Pacific Ocean. It is 5 m. long and from 1 m. to 2 m. broad, and has bold and rocky shores, rising on the N. side to 200 ft. The bridge spanning the Golden Gate, opened 1937, has the world's longest single span (over 4,000 ft.). It crosses a waterway of 6,200 ft.; the towers are 746 ft. high; and the roadway has 200 ft. clearance above high water level. It was begun in 1933 and completed in 1937 at a cost of £7,000,000. See *Bridge illus.*, p. 1424.

**Golden Hind**. Ship in which Sir Francis Drake sailed round the world. One of five frigates which



Golden Hind. Model of the ship in which Drake sailed round the world, 1577-80

left Plymouth late in 1577, the *Golden Hind* (originally *Pelican*), navigated by Drake himself, was the sole survivor of the fleet to pass through the Straits of Magellan (Aug.-Oct., 1578) and into the Pacific. The *Golden Hind* ended her voyage on Sept. 26, 1580. Queen Elizabeth came to Deptford and there knighted Drake. On her command the ship was at first preserved, but 100 years later had to be broken up. From the sound timber was made a chair, presented by Charles II to Oxford University.

H.M.S. *Golden Hind* is the name given to the Royal Navy barracks, 480 acres in extent, established at Sydney, New South Wales, in 1945.

**Golden Horde**. Name given to a body of Tartars who invaded Europe in the 13th century. They

belonged to a branch called Kipchaks. Led by Batu, a grandson of Jenghiz Khan, they crossed Russia into Hungary about 1237. Attempts to stop them failed until 1241, when they were checked, and settled on the Volga.

Under Batu's son the empire, or khanate, was consolidated. The group accepted Islam; but soon its power began to fail. About 1395 the khanate was defeated by Timur, and by about 1500 it had disappeared. The name golden horde was due to the splendid camp (Turk. *ordu*) set up by Batu.

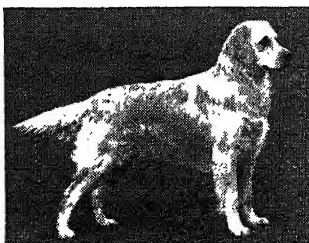
**Golden Horn.** THE. Narrow inlet of the Bosphorus (*q.v.*) which divides the main port of Istanbul from the Galata and Pera quarters of the city. See Istanbul.

**Golden Legend.** THE. English title of a collection of lives of the saints, *Legenda Sanctorum*, compiled by Jacobus de Voragine, archbishop of Genoa (d. 1298). The first Latin edition was printed at Basel about 1470, and an English translation, made from the French by Caxton, was printed by him in 1483 (ed. F. S. Ellis, 1900). The *Legenda Aurea*, as it was soon popularly called, in recognition of its great worth, was translated into most European languages, and frequently reprinted during the first half of the 16th century. The standard edition of the Latin text is by J. G. T. Grasse, 1846. The *Golden Legend* is also the title of a dramatic poem by Longfellow on which an oratorio was based by Sullivan.

**Golden Number.** Number of any year in the Metonic cycle (*q.v.*), a period of 19 solar years which is equivalent almost exactly to 235 lunations. It may be 1 to 19 and is found by adding 1 to the year and dividing by 19: the remainder is the golden number; if there is no remainder, the golden number is 19. It may be so called because in ancient Athens the dates of full moon for 19 years were shown in gold on pillars.

In the Christian era the golden number is used in calculating the date of Easter.

**Golden Retriever.** Handsome gundog, probably a sport from the original flat-coated retriever and pure bred throughout its history. It is a powerful and active dog, with kindly expression, a flat or wavy outer coat, well feathered,



Golden Retriever. Bolthy Skylon, a champion specimen

and a dense undercoat; its colour may be any shade of gold or cream, but neither red nor mahogany. It is gentle in character and steady in work. Dogs should weigh 65-70 lb., and stand 22-24 ins. at the shoulder; bitches 55-60 lb. and 20-22 ins.



Golden Rod. Flower-heads of the wild species

**Golden Rod** (*Solidago virgaurea*). Perennial herb of the family Compositae, native to Europe and N. America. Its root-stock is stout, and the stems erect and slightly branched, clad with narrow lance-shaped leaves, and terminating in clusters of small yellow flower-heads. It grows on stony banks and dry ground. The golden rod of gardens (*S. canadensis*) is a N. American species, with taller stems and the flowers in long pyramidal sprays.

**Golden Rose.** Rose of wrought gold with jewelled petals, blessed by the pope and either presented to some favoured individual or preserved in the Vatican. The custom of blessing roses on the 4th Sunday in Lent, hence called *Dominica rosa*, originated early. Consecrated roses, as symbols of silence, were set over the doors of confessionals, and from this practice arose the phrase *sub rosa*, under the rose, meaning in confidence. A golden rose was presented to Fulk VI of Anjou by Urban II when the first crusade was being organized in 1095, and from about the middle of the 14th century the pope annually presented such a rose to a chosen recipient. Henry VIII was given three of these

specimens of the goldsmith's art; and in 1906 Pius X presented one to Queen Victoria of Spain.

**Golden Rule.** Term often applied to the precept of Christ in the Gospel (Matt. 7, 12), "Whatsoever ye would that men should do to you, do ye even so to them"; often contracted into "Do as you would be done by."

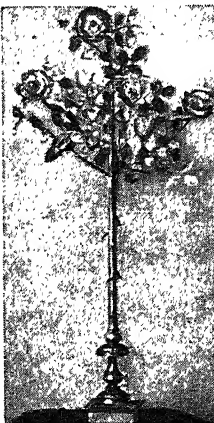
**Golden Square.** Londonsquare between Beak Street and Brewer Street, just E. of Regent Street, W.1. Laid out at the end of the 17th century, it was a fashionable place of residence in the 18th century. Most of the premises have been rebuilt and many are occupied by woollen cloth merchants. The Royal National Throat, Nose, and Ear Hospital is situated in the N.E. corner of the square.

**Golden Treasury.** Short title of an anthology of poetry collected and arranged by F. T. Palgrave (*q.v.*), in full *The Golden Treasury of the Best Songs and Lyrics in the English Language*. This volume, which appeared in 1861 and ranged over lyrical poetry from Nashe to Wordsworth and Rogers, became a standard work. A second issue, 1897, included the work of later Victorians; subsequent editions were extended to include contemporary lyrics.

**Golden Wedding.** Fiftieth anniversary of a wedding. The term arose from the golden present which is regarded as the most suitable offering from the husband to the wife. The other principal wedding anniversaries are the twenty-fifth, silver; the thirtieth, pearl; the fortieth, ruby; and the sixtieth, diamond.

### GOLDERS GREEN.

Residential district of Middlesex, England. Lying in the S.E. of Hendon borough, it is 1½ m. N.W. of Hampstead on the Northern Line. Adjoining West Heath, Hampstead, is Golders Hill Park, 36 acres, purchased in 1898 from the executors of Sir Spencer Wells for £38,500, with lakes, enclosures for red deer, wallabies, peafowl, etc.; the mansion which formerly stood in the grounds was destroyed during the Second Great War by a German bomb. About ½



Golden Rose given by Pius II to Siena in 1458

m. from the rly. station is Golders Green crematorium.



**Goldfinch** (*Carduelis carduelis*). Common British and Continental song-bird. About 5 ins. long, its plumage is handsomely marked with black, crimson, white, and yellow. It eats grubs, aphides, and small seeds, and is useful in keeping down the growth of noxious weeds, especially thistles. It nests in trees about May and lays four or five eggs. See Eggs, colour plate.

**Goldfish** (*Carassius auratus*). Small fish of the carp family. It is a native of China and Japan. Originally brown, the golden hue and the various strange and even monstrous types are the result of selective breeding. It is said to have been introduced into Great Britain about the close of the 17th century. Its handsome appearance and hardy constitution make it a favourite species for the aquarium. A specimen has been



Goldfinch. Song-bird of the British hedgerows  
Berridge



Goldfish. Specimen of the variegated kind of this small carp

known to live 29 years in a tank, being fed three times a week on tiny scraps of raw meat. A more convenient food is finely crushed vermicelli, sprinkled on the water in moderate quantities.

The aquarium for goldfish should be more wide than deep, so as to present a large surface for the absorption of air: and be supplied with growing weeds. If the fish are seen gaping at the surface, it is a sign that the water is not sufficiently aerated. They will breed in a large tank, but may do better in a small pond. See Carp. Consult Goldfish Culture for Amateurs, A. E. Hodge, 1939.

**Golding, Louis** (b. 1895). A British author. Born of Jewish stock in Manchester, he was educated at the grammar school there and at Queen's College, Oxford. His first book, a volume of



Louis Golding.  
British author

poems, *Sorrow of War*, appeared in 1919; *Shepherd Singing Ragtime*, 1921; his first novel, *Forward From Babylon*, 1920.

Of his powerful fictional studies of Jewish life the best known is *Magnolia Street* (1932, dramatized 1934) in which Manchester figured as Doomington. Other novels are *Five Silver Daughters*, 1934; *The Camberwell Beauty*, 1935; Mr. Emmanuel, 1939 (filmed 1944); *The Glory of Elsie Silver*, 1945. Golding also wrote biography and travel books.

**Goldingen**. German name of the Latvian town noted under Kuldiga.

**Gold Lace**. Ornamentation employed on uniforms and ceremonial dress. It is particularly used upon the uniforms of naval officers, soldiers in some regiments, ecclesiastical and theatrical garments, and liveries. The term denotes braid or cord, though gold pillow lace is also made. The gold thread for making the lace is drawn out so thin that from 1,100 to 1,400 yds. will weigh 1 oz. It is then flattened by steam rollers and wound by machinery round a strand of silk. A finer thread up to 2,000 yds. per oz. is made by drawing it through holes in a diamond or ruby. Some so-called gold lace is made of mixed copper and silver, or of gilded copper, Dutch metal, or lacquered brass. In cheap varieties the core is of cotton thread instead of silk.

**Gold Leaf**. Thin sheet of gold chiefly used for gilding. The process is of great antiquity, and was probably first carried out in the Far East; but the early Greeks were able to produce leaf not much over 1/100,000 inch in thickness, about three times the thickness of fine modern leaf. The Hebrews and the Egyptians were acquainted with the art, fine specimens of leaf having been found in several ancient Egyptian mummy cases.

Gold leaf is today prepared by first casting the metal in small ingot moulds, using extra high temperature to increase fusibility, followed by annealing the ingots in hot ashes to clean them from grease and improve malleability; rolling down the ingots between hard, highly polished steel rolls, each into a ribbon 10 ft. in length by 1½ ins. wide to the oz. of metal; again annealing after cutting the ribbon into small pieces; piling

the little squares between sheets of special paper in a *cutch*, 150 at a time, and beating with a heavy hammer till each piece is about 4 ins. square; cutting these each into four; piling and beating again in a *shoder*, with lighter hammers, the separating material at this stage being gold-beaters' skin; removing from the shoder, cutting again into four; piling in a final shoder and beating till the pieces are 3 ins. or 3½ ins. square.

Thus the 150 original small squares become 2,400 leaves, which are finally trimmed and packed, 25 at a time, in "books" between thin paper which has been rubbed with ochre to prevent the leaves adhering. The final thickness is usually about one 290,000th of an inch. The finest leaf is produced from pure metal, but gold for common purposes may be alloyed with silver or copper or both. See Gold.

**Goldmark, KARL** (1830-1915). A Hungarian composer. Born at Keszthely, May 18, 1830, he



Karl Goldmark,  
Hungarian composer

studied music at the Vienna conservatoire, afterwards playing in theatrical orchestras in Hungarian towns. Fame came to him through his overture *Sakuntala*, produced in Vienna in 1865, and this was greatly enhanced by his opera *The Queen of Sheba*, 1875. His compositions, which include the operas *Merlin*, 1886, *The Cricket on the Hearth*, 1896, and some orchestral pieces, are distinguished for their rich orchestral colouring. Goldmark died Jan. 2, 1915.

**Goldoni, CARLO** (1707-93). Italian dramatist. Born at Venice, Feb. 25, 1707, the son of a physician, and intended for the law, he joined a company of actors, took to play-writing, and in a quick succession of comedies revolutionised the Italian stage. Facile in com-



Carlo Goldoni,  
Italian dramatist

position, fertile in invention, with a gift for writing animated dialogue, and an abounding sense of humour, he wrote many works more remarkable for their wit than their morality, such as *The Twins of Venice*, *The Weak-Headed Lady*,

The Lady of Merit, The Obedient Daughter, and The Landlady; comedies that, at least, reflected much of the lighter life of his time.

A dispute with his rival, Count Gozzi, who provoked him by parody, led Goldoni to leave Italy for Paris, where he became attached to the court and received a pension from Louis XVI. Having suffered privation during the Revolution, he died Feb. 6, 1793. See Italy: Literature; consult also *Memoirs*, reissued in English, 1926; G. and the Venice of his Times, J. S. Kennard, 1920.

**Golds.** Primitive tribe on the banks of the lower Amur, Sungari, and Usuri rivers, E. Siberia. Allied to the Tungus in race and speech, and preserving primitive Altaian characters and shamanism, they and their swine and dogs subsist mainly on river fishes. They practise a skilful decorative art.

**Gold Salts.** Gold unites directly with chlorine to form gold dichloride, which when brought in contact with water is decomposed into aurous chloride ( $\text{AuCl}$ ) and auric chloride ( $\text{AuCl}_3$ ). Auric chloride or gold trichloride is, however, usually made by dissolving gold in aqua regia, a mixture of four parts of hydrochloric acid and one part of nitric acid. Gold trichloride is used in photography for toning silver prints, a process which replaces the silver of the photograph by metallic gold.

The oxides of gold are prepared from the chloride, and from gold trihydroxide is made the form of metallic gold used in miniature painting. See Gold.

**Goldschmidt, MEIER ADOLF** (1819-87). Danish author. He began his career as contributor to *Nestved Ugeblad*, later *Corsaren*, the Danish Punch. His first novel, *The Jew*, 1845, provided him with a theme that he made his own among Danish novelists, and to which he returns in many of his Tales, 1846, and later books. He started two journals: *North and South*, 1847, a monthly magazine written entirely by himself; and *At Home and Abroad*, 1861, to which he contributed brilliant articles on life and politics. Among his novels may be mentioned *Homeless*, 1853-57, Eng. trans. by the author, 1861; *The Heir*, 1865; *The Raven*, 1867; *Avrohmche Nattegal*, 1871.

**Goldschmidt, VICTOR MORITZ** (1888-1947). A Swiss chemist. Born at Zürich, he studied mineralogy, geology, and chemistry at Oslo, Vienna, and Munich. In

1914 he was appointed director of the mineralogical institute at Oslo, and during 1917-30 was director of the Norwegian government's raw materials laboratory. Professor of crystallography, mineralogy, and petrography at Göttingen, he resigned in 1935 as a protest against the Hitler regime. Goldschmidt was sent to a Norwegian concentration camp by the Germans in 1942, but escaped to Great Britain, where he worked for the agricultural research council. Returning to Oslo in 1946, he died there March 20, 1947. He laid the foundations of geochemistry by studying the laws of distribution of chemical elements as a function of their atomic or ionic properties and their nuclear stability.

**Goldsmith.** One who works in gold. The term is also applied to workers in precious metals generally and to dealers in gold and silver plate. Goldsmiths were among the earliest of craftsmen and are referred to in the O.T. (Neh. 3; Isaiah 40, 41, 46).

The craft was brought to a high perfection in Italy. France, and

him to beat out the two bronze gates for the baptistery at Florence which Michelangelo declared were worthy of Paradise. (See Door illus.) Goldsmiths were also bankers. See Banking; Goldsmiths' Company; Hall Mark; Jewelry; consult also *The Art of the Goldsmith and Jeweller*, T. B. Wigley, 1898; *English Goldsmiths and Their Marks*, C. J. Jackson, 1905; *Goldsmiths' and Silversmiths' Work*, N. Dawson, 1907.

**Goldsmith, OLIVER** (1728-74). Irish writer. Born at Pallas, co. Longford (or possibly at Elphin, co. Roscommon), Nov. 10, 1728, the son of a clergyman, he spent the greater part of his boyhood at the little village of Lissoy, Westmeath—Sweet Auburn of The Deserted Village. Neither at school nor at Trinity College, Dublin, where he went in 1744, did Goldsmith give promise of future greatness. Successive attempts to get him into the Church and the legal profession having failed, Goldsmith's relatives sent him to Edinburgh to study medicine in 1752, with equally unsatisfactory results. During 1754-56 he visited Holland, ostensibly studying at Leyden, Belgium, France, Switzerland, Italy, and Germany, journeying on foot from place to place. Sometimes he enjoyed the hospitality of universities which welcomed peripatetic scholars to their disputations; more often he was dependent for food and lodging on some humble wayside cottage whose inmates he repaid by a tune on his flute. Goldsmith's experiences during these years are reflected in his poem *The Traveller*.

Settling in London in 1756, Goldsmith tried many ways of earning a living, including acting and teaching, but always without success. Failing to pass the examination for surgeon's mate in the navy, he determined to settle down as a bookseller's hack, writing on an amazing variety of subjects of which he had no particular knowledge. This class of work he continued more or less all the rest of his life. A book on *Natural History* and histories of England and Rome are the most notable of his hack productions.

His first real contribution to English classics was the *Letters of a Citizen of the World*, 1762, originally issued serially in *The Public Ledger*. The *Letters* professed to be from the hand of a Chinese philosopher on a visit to England, and contain diverting comment on contemporary life



*Oliver Goldsmith*  
From the portrait by Reynolds in the  
National Portrait Gallery

Germany. In England more attention was paid to silver plate, though the goldsmith's craft was not neglected. Owing to the great value of gold, artists chose bronze for the bulk of their grander conceptions, but many of the greatest painters and sculptors began their art education in the goldsmith's shop.

Francia signed several of his pictures "Francia the goldsmith." Ghirlandaio, Michelangelo's teacher, was goldsmith as well as painter. Verrocchio, the master of Leonardo da Vinci, practised the art. Ghiberti acquired as goldsmith the skill which enabled

and manners. By this time Goldsmith had written for periodicals, including *The British Magazine*, started by Smollett, with whom Goldsmith was on friendly terms. He had also published *An Inquiry into the State of Polite Learning in Europe*, which had a favourable reception. In 1761 Goldsmith became friendly with Dr. Johnson, and was soon a regular member of the Johnsonian circle, which included Burke, Reynolds, and Garrick.

Fortune, long so unpropitious, now began to smile on him. In 1764 appeared *The Traveller*, which in Johnson's opinion gave Goldsmith a high place in English literature. This was followed by that imitable story, *The Vicar of Wakefield* (1766), and *The Deserted Village* (1770), one of the most charming of English poems. He also essayed writing for the stage with *The Good Natured Man* (1768) and *She Stoops to Conquer* (1774), successful on its production and a favourite to this day. His last piece of work was the satirical poem *Retaliation*, written shortly before his death. Notwithstanding the comparative affluence of his later years, he died in London, April 4, 1774, £2,000 in debt. A memorial in the Temple churchyard, since destroyed, marked the approximate position of his grave; and there is a cenotaph to him in Westminster Abbey with an inscription by Johnson.

As a poet Goldsmith will always command a high place. Though under the influence of the school of Pope, he shows a humanity and breadth of feeling not usually associated with that school. His prose is marked by simplicity, clarity, and singular charm. *The Vicar of Wakefield*, notwithstanding its faults of construction, shows great skill in characterisation and is a notable landmark in the evolution of the novel.

Personally Goldsmith was one of the least favoured of men, shy, awkward, and sadly marked by smallpox. His associates regarded him with mingled respect and contempt, for if he was vain and feckless he was warm-hearted. Johnson said that as a writer he touched nothing that he did not adorn; Garrick, that he "wrote like an angel and talked like poor Poll." The best biography is by J. Forster, 6th ed., 1877; others are by W. Irving, 1849; W. Black, 1878; A. Dobson, 1888; F. F. Moore, 1910; S. Gwynn, 1935. *Collected Letters*, ed. K. C. Balderson, appeared 1928.

**Goldsmiths' Company.** Fifth of the twelve great London city livery companies. The Worshipful



Goldsmiths' Company arms

Company of Goldsmiths received its first royal charter in 1327, but a guild of fraternity of Goldsmiths was in existence by 1180. One of the craft guilds formed for the mutual benefit of members and the regulation of their crafts, it has, more than any, retained its connexion with its own industry.

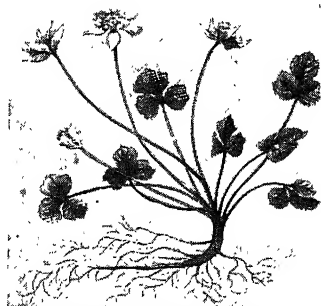
Goldsmiths' Hall has always stood on its present site in Foster Lane, E.C.2. The present building, completed 1835, is the fourth. The drawing and dining rooms were destroyed by a German bomb, April 17, 1941, but were subsequently restored.

Wares in gold and silver are delivered at Goldsmiths' Hall and after being assayed are impressed with the London hall mark. The company has since the Middle Ages been responsible for checking the coinage of the realm. It has a unique collection of silverwork by the best craftsmen. Much of the company's funds has been used for education, hospitals, etc. Goldsmiths' College, founded as a technical institute at New Cross in 1889, was handed over to the University of London in 1904; it includes a teachers' training college, art school, and evening institute.

**Gold Standard.** Financial term meaning that the value of goods, services, currency, etc. is related directly to gold, which through custom has come to be accepted as having a stable value. A country is on the gold standard when its standard coin is of gold, and its citizens may, at their own option, make payments at home and abroad either in their own currency or in gold of the same value by weight. If all countries were on the gold standard, the purchasing power of their currencies would be proportional to the gold content of their respective standard gold coins. For the establishment of the gold standard all over the world, each country would have to possess and maintain a stock of gold, and allow a free market in it. Because of the unequal ownership and distribution of gold, such a condition has never existed, though certain countries (e.g. Great Britain from 1816 to 1914) have been from time to time on the gold standard. See *Exchange*.

**Gold Stick.** A British court official. In England the appointment is held in turn by the colonels of the regiments of household cavalry, each of whom is in waiting for a month at a time. The captain-general of the Royal Company of Archers is Gold Stick for Scotland. The officer in waiting walks behind the sovereign on state occasions.

**Gold-thread** (*Coptis trifolia*). Perennial evergreen herb of the family Ranunculaceae. It is a native of N. America and N. Europe. The rootstocks are bright



Gold-thread, a perennial herb whose roots are used medicinally and for dye

yellow and bitter, the leaves divided into three oval leaflets, and the white flowers have both sepals and petals coloured. The roots are used as a tonic, and for dyeing.

**Goldwyn, SAMUEL** (b. 1882). Polish-born American film producer. Born in Warsaw, Aug. 27, 1882, he emigrated and became a glove manufacturer in New York. He was co-founder of the Jesse Lasky Feature Photoplay Co., 1913, and in 1918 started the Goldwyn Pictures Corporation, absorbed in the Metro-Goldwyn-Mayer company in 1924. Elected owner-member of United Artists Corporation in 1927, Goldwyn resigned his interest in 1940. One of the most outspoken personalities in the cinema business, he introduced many players who became stars, e.g. Ronald Colman, Gary Cooper, Danny Kaye.

**Goletta** or **LA GOULETTE**. Port of Tunisia, on the Bay of Tunis. Formerly the port of Tunis, which lies 7 m. W., it is now connected with the city by a ship canal through Lake El-Bahira. Since the cutting of the canal and the deepening of the harbour at Tunis, Goletta has lost its former importance. Many of its buildings are constructed of stone from the ruins of Carthage. It was taken by Charles V in 1535, but regained by the Turks in 1574

## GOLF: THE ROYAL AND ANCIENT GAME

Robert H. K. Browning, Editor of Golfing

*A game of great antiquity, golf has changed more in the twentieth century than in several centuries before. Here is its history and a description of the points of play by an expert. See also Ryder Cup; Walker Cup; and biographies of Braid; Cotton; Jones, R. T.; Vardon, etc.*

Golf is a game played over open country, in which a small, hard ball has to be struck by means of clubs of various designs up to and into a succession of holes of a regulation diameter of  $4\frac{1}{4}$  ins., the object of the player being to hole out at each hole in the smallest possible number of strokes.

The governing body of the game in Great Britain is the Royal and Ancient Golf Club of St. Andrews, founded in 1754, and given its present title by William IV in 1834. Its code of rules (which was revised from Jan. 1, 1950) is now accepted almost universally.

### Development of Links

Originally golfers found their courses by the seashore among sand dunes, which provided the necessary obstacles to give variety to the play, or on waste land or village commons, which afforded other natural difficulties; but since the inauguration of the Royal North Devon club at Westward Ho! in 1864, the majority of golf courses have been artificial creations, laid out on terrain of many different types, the chief hazards taking the form of bunkers, that is, of shallow pits filled with sand, the difficulty of playing out of the pit being usually enhanced by the construction of a steep bank or parapet on the side nearest to the hole. Originally, also, the spots chosen for the various holes were where some natural plateau or hollow of finer turf suggested itself as particularly suitable for the task of holing out. In present-day golf each hole is surrounded by a green of carefully prepared turf kept closely mown to facilitate the final putts by which the ball is guided into the hole.

In imitation of St. Andrews, eighteen has been universally adopted as the standard number of holes for a round (though courses sometimes have only nine holes and a round is achieved by playing them twice over); but this number is not obligatory. The earliest codes of rules of the game show that it was at one time customary for the player to place, or tee, his ball close to one hole when striking off to the next, but today a prepared starting point, or teeing-ground, is pro-

vided for each hole. The custom of the game permitted the player to tee the ball for the first stroke by placing it on a pinch of wet sand, usually replaced nowadays by a peg of wood or plastic. The distance from teeing-ground to hole may be anything from 90 to 600 yards or even outside these limits, but as the ingenuity of the manufacturers of balls and clubs has enabled players to hit the ball farther and farther, the tendency has been for courses to become correspondingly longer. and no course is considered first class which has a total length for the eighteen holes of less than 6,000 yards; while for championship play the best courses are 7,000 yards or more. The length of the individual holes, however, ought to be as diversified as possible. Between teeing-ground and hole is a prepared fairway, on which the grass is kept short, bordered on either side by an expanse of uncut grass, known as the rough.

A typical eighteen-hole course would be made up of three or four short holes of from 130 to 230 yards, at which the player would hope to put his ball on the green with his first stroke; a similar number of long holes of 500 yards or more, at which even a first class player would expect under normal conditions to require two full shots and something more to reach the green; and the remainder two-shot holes of from 280 to 460 yards providing tests of varying degrees of difficulty, and of the player's ability to cover the distance in two strokes.

### Opening and Approach Shots

The play to a typical two-shot hole consists of an opening shot, or drive, from the teeing-ground, by means of which the player tries to send the ball as far on its way as possible; a second shot or approach by which he endeavours to combine direction and distance with such nicety of judgement as to place his ball on the green; a long putt which rolls the ball up to within three or four feet of the hole, and another putt which rolls the ball actually into it. A good player will expect to complete the round of eighteen holes in an average of four strokes per hole.

The fundamental simplicity of the game lends itself to a great variety of methods of determining the result of the play. Those in most general use are:

(a) **STROKE PLAY.** In this form of the game each player's score is determined by adding together the number of strokes he has taken to hole out at each of the eighteen holes, the aggregate forming his score for the round; the player with the lowest aggregate for the round (or rounds because championships and other big tournaments are usually decided over four rounds) is adjudged the winner. This method of scoring is the most satisfactory for all events in which large numbers of players compete.

(b) **MATCH PLAY.** In this, the oldest and for long the only form of the game, the result is decided by holes, the player or side holing out in the fewer strokes at each hole being the winner of that hole, and the player or side winning the greater number of holes over the round being the winner of the match. When both players hole out in the same number of strokes, the hole is said to be halved; when both players over the round win an equal number of holes, the match is also said to be halved or to finish all square.

### Usual Types of Match

The most usual forms of match play are (i) between two individual opponents, in which case the match is called a single; (ii) between two sides of two players each, the partners on each side using one ball and playing alternate strokes, in which case the match is referred to as a foursome; and (iii) between two sides of two players each, each of the four players playing his own ball, but the better score of each pair being regarded at each hole as the score of the side. This form of play is called a four-ball match. In the U.S.A. the second of these forms of match-play is seldom seen, and a four-ball match is regularly described as a foursome.

(c) **BOGEY PLAY.** This is an attempt to combine the chief features of methods (a) and (b), to allow of a large field competing by holes play. Each player engages in a match by holes against the same imaginary opponent whose bogey score for every hole is formulated in advance.

One of the greatest attractions of golf is that it readily lends itself to matches between players, and to competitions among fields of players, of very different degrees

of skill, by the allotment to each player of a handicap of so many strokes per round, based on a standardised system. In handicap events, each player in stroke play deducts his handicap from his aggregate for the round; in match play the handicap takes the form of deducting a stroke from his score at each of a number of previously specified holes.

**HISTORY.** The earliest reference to golf occurs in an Act of parliament of the reign of James II of Scotland, dated March 6, 1457, by which it was decreed "that the Fute-ball and Golf be utterly cryit downe and nocht usit" in the interests of archery practice for the national defence. There is no evidence of any kind to support the suggestion that the game was brought to Scotland from outside. The oft-quoted theory that the game was brought from the Netherlands has its origin in the resemblance to golf of the Dutch game of *kolven*, as depicted in some of the winter scenes in Dutch paintings of the earlier half of the 17th century. But *kolven*, which is still played in the Netherlands, is not a field sport at all, and has little in common with the Scottish game. The Belgian cross-country game of *chole* does indeed bear some resemblance to golf, but a vital point of difference is that the opposing sides both strike at the same ball. The essential features of golf, the combination of hitting for distance with the nicety of the final approach to an exiguous mark, and the independent progress of each player, free from any interference by his opponent, belong to Scotland alone. Yet as long as the game

was played by Scotsmen only, little progress was made either in the evolution of the equipment of the game or in the scientific study of golfing style.

In the first half of the 19th century the golf ball was of leather stuffed with feathers, of which it was said that as many as would fill a tall hat were forced into the neatly stitched cover. These balls were highly resilient, but in other respects they were not satisfactory; they were costly, did not stand up to wear and tear, quickly lost their shape in wet weather, and were too easily destroyed by a chance hack from the blade of an iron club, which allowed the feathers to

escape through the gaping wound. The introduction of balls of gutta percha in 1848 was the first step in the evolution of the modern game.

The only defect of the gutta percha ball as compared with the feathery one was its lack of resilience, which made it difficult to get the ball up into the air; but it was a long time before golfers realized the necessity of modifying their style to suit. Even as late as 1890, when the golf boom was starting in England golfers were still clinging to the wide, flat, sweeping swing which had come down to them from the days of the feathery, and Horace

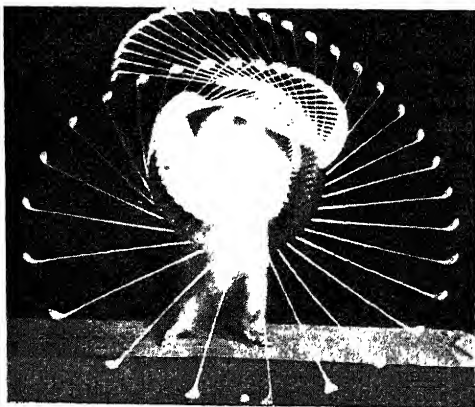
Hutchinson, winner of two of the first three amateur championships, could lay it down that the correct attitude for the drive was with what would now be called a closed stance, with the left foot forward and the right drawn back, and the ball opposite the left heel. A

revolution in style, however, followed the victories of Harry Vardon in the open championships of 1896, 1898, and 1899. His swing was so smooth and easy that it seemed easy to imitate, and within a few years he became the model for the whole world. His method of holding the club, with the Vs formed by the forefinger and thumb of each hand on top of the shaft, and the little

finger of the right hand riding in the hollow between the forefinger and second finger of the left, has ever since been adopted by the majority of first class players and is everywhere known as the "Vardon" grip, though it was in fact used by John E. Laidlay, the Scottish amateur, for many years before Vardon adopted it. With Vardon also came in the vogue of the open stance, with the right foot advanced and the left drawn back and the ball opposite a point almost midway between the heels. The finger grip, the open stance, and the upright swing all helped to get the solid ball into the air.



Golf. The Vardon overlapping grip, illustrated by a direct plaster cast from Harry Vardon's hands. Reproduced from the original at South Herts Golf Club, by courtesy of the Committee.



Golf. Multiple flash photographs of Bobby Jones driving. Above, swing with a wooden club, showing transference of weight from right to left foot, to keep club head in widest possible arc. Right, swing with iron club, to obtain accuracy rather than power.



The next great change came with the introduction of the rubber-cored ball at the beginning of the 20th century. This soft, resilient ball made golf much easier and pleasanter for ladies, young players, and old men; but as manufacturers year after year increased the resilience and travelling power of the ball, the problem became not how to get the ball into the air, but how to keep it from soaring, and golfers went back, if not to the closed stance, at least to a square stance with the feet equally distant from the intended line of play, and the ball again well forward opposite the left heel.

#### Development of the Swing

The invention of the cine-camera made possible a more detailed analysis of the swing, and between 1921 and 1933 the successes of the American players, which culminated in 1930 in "Emperor" Bobby Jones winning the British and American open and British and American amateur championships all in the same year, encouraged the general acceptance of a simplified and more scientific conception of the swing, the chief features of which are:

(a) the straight left arm, which keeps the head of the club travelling in as wide an arc as possible, and allows the player the time and space in which to work up to the maximum of speed at the moment of striking;

(b) the grooved swing, which keeps the club throughout the stroke as far as possible in one plane of movement.

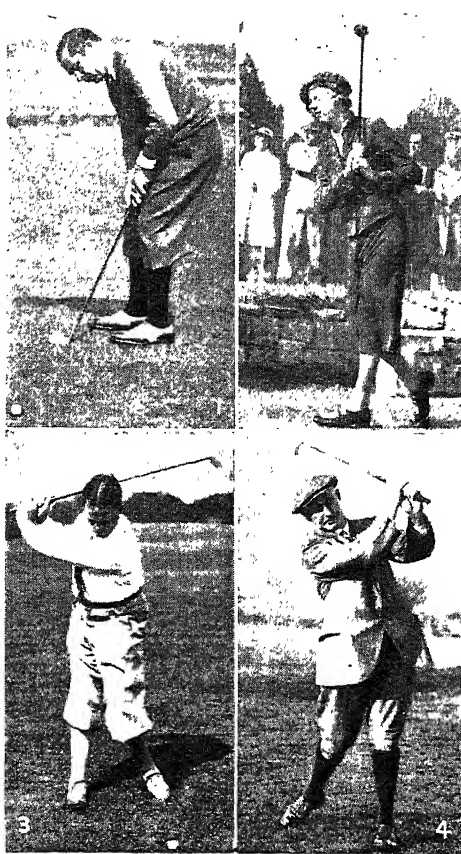
The swing of the present day players is much shorter than the swing favoured by their forefathers, but that is partly due to the fact that so much extra power is now supplied by the resilience of the ball and the whip of the steel shaft. So much, indeed, has the golfer been aided by successive improvements in the weapons of the game that the rules of golf committee has been forced to restrict the ingenuity of the manufacturers, by the limitation of the ball to a maximum weight of 1.62 oz. and a minimum size of 1.62 ins. in diameter, by forbidding any substantial departure from the traditional and accepted form and make of clubs, and by restricting the number of clubs a player may carry to fourteen in all.

The development of approach play has been even more remarkable. Originally all the clubs used for normal strokes had heads of

wood, the player using spoons designed with different angles of loft according to the extent to which it was desired to raise the ball in the air. For the typical approach shot in which the ball had to be tossed high in the air in order to clear a bunker or other hazard between the player and the green, and yet stop quickly on coming to earth again, the player made use of a baffing stroke in which the bottom or sole of the club head struck the ground a fraction of a second before the face made contact with the ball, the result being to toss the ball up with the desired lofty, lifeless flight. At this period the only clubs with iron heads were the track irons designed for playing the ball from roads and similar hard surfaces which might have damaged the wooden-headed clubs.

The Rev. Dr. J. G. Macpherson,

who was one of the greatest golfers at St. Andrews when he was a student there in the middle of the 19th century, records that it was Allan Robertson, the first of the great professional players, who introduced the idea of using the iron for the approach shot. "Young Tom" Morris, another hero of the game, who won the Open Championship on four successive occasions, took the process of development a stage further by playing the pitch shots with his niblick, which in those days had a very small head, being designed for playing the ball from cart-ruts and similar difficult positions. In a challenge match played at St. Andrews when the links were covered with snow and play was possible only by sweeping a narrow circle round each of the holes, it is recorded that at hole after hole, Young Tom was able to pitch the ball into the circle and make it stop there, "as if it

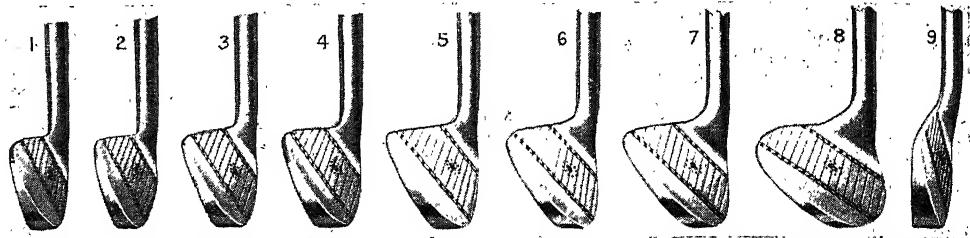


Golf. Exponents of correct stance and of ease and smoothness in swing. 1. Walter Hagen demonstrating straight line putting. 2. Joyce Wethered at the finish of a drive. 3. Bobby Jones at the top of a swing for an iron shot. 4. Harry Vardon at the finish of an approach shot with the mashie

had a string tied to it." The small head of the niblick, however, made it unsuitable for this purpose, and in its place the manufacturers designed the mashie, with a similar degree of loft but a wider and deeper blade.

The acknowledged master of this club was J. H. Taylor, who in 1894 became the first English professional to win the open championship. He introduced the cut shot, which was played by standing to the ball with the right foot much advanced and swinging the club so as to draw the blade from right to left across the under side of the ball. This was then thought to be the easiest method of imparting the back spin needed to make the ball draw up quickly on landing, but the method had the defect that the drawing of the blade across the ball tended to produce a side spin that made the ball swing in a





Golf. Set of modern clubs: 1-4, related iron heads; 5-6, mashies; 7, mashie-niblick; 8, niblick; 9, putter  
Courtesy of A. G. Spalding & Bros., Ltd.

curve towards the right, and players were advised to aim to the left of the flag to allow for this drift. It was left for Ted Ray, the winner of the open championship of 1912, to demonstrate that the cut constituted a needless complication, and that the same result could be achieved by using a still more lofted club and hitting the ball straight. The cut shot came to be used only when it was desired to make the ball rise very steeply in order to clear a tree or the bank of a bunker or some other obstacle immediately in front.

#### Matched Set of Irons

Approach play has been greatly simplified by the creation of matched sets of irons of similar weight and balance and carefully graded degrees of loft. The normal set is numbered from one to eight, corresponding roughly to the old nomenclature as follows (in increasing order of loft): No. 1, cleek; No. 2, long iron; No. 3, mid-iron; No. 4, lofting iron; No. 5, mashie; No. 6, spade-mashie; No. 7, mashie-niblick; No. 8, niblick. With the exception of the No. 1, which is a distance club used in much the same fashion as the wooden clubs, all these clubs are played with the same restricted swing, the only variation being that as the distance to be covered becomes shorter and the club selected correspondingly more lofted, the player stands slightly closer to the ball (the lengths of the clubs' shafts being also graded to suit) and slightly more open, in order to adapt his swing to the fact that as less power is required the club is not taken so far round. When it is desired to make the ball draw up more than usually quickly, the amount of back-spin can be increased by using a more lofted club and standing slightly further forward so as to hit down on the ball, which is thus squeezed out between the blade of the club and the turf.

In the art of holing out, the steady improvement in the tex-

ture and quality of the greens has led to a corresponding rise in the standard of accuracy expected from the players. The American golfers, with Walter Hagen as their great example, have taught the world that the simplest and most scientific method of putting is to keep the head of the club travelling backwards and forwards in a straight line through the ball, with the blade of the club kept at right angles to that line throughout the stroke. Generally speaking the golfer of today has a much smaller variety of strokes than his grandfather had, but by way of compensation has to play this limited variety of strokes with greater nicety of judgement.

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**Golgi, CAMILLO** (1843-1926). An Italian physician. He was born near Brescia, July 7, 1843. As resident physician at a provincial home for incurables, he wrote the early scientific papers that made him famous and discovered a method of staining nerve cells. By this discovery the histology and physiology of the central nervous system were first placed on a sound foundation, and for this Golgi received, conjointly with Ramon y Cajal, the Nobel prize for medicine in 1906. He was later

professor at Siena and at Pavia. In pathology Golgi is best known for his work on malaria and on the parasites of tertian and quartan fever. He died Jan. 21, 1926.

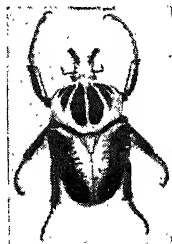
**Golgotha** (Heb., skull). Hill outside Jerusalem where Christ was crucified. See Calvary.

**Goliath.** Philistine of Gath. He was a man of gigantic stature who challenged Saul's soldiers to single combat, and was slain by David with his sling. There appears to have been another Goliath of Gath who was killed by Elhanan, one of David's men (1 Sam. 17-22).

**Goliath Beetle** (*Goliathus*). One of the largest tropical beetles.

Found in Cent. and S. Africa, it frequently measures 4 ins. in length. Its colour is usually black, but it is often variegated with white. It is said to live on the sap of forest trees. See Beetle; Insects.

**Gollancz, SIR ISRAEL** (1864-1930). A British man of letters. Born in London, July 13, 1864, and educated at the City of London School and Christ's College, Cambridge, he became professor of English literature at King's College, London, 1906. He was also secretary of the British Academy from its foundation in 1903 until his death, June 23, 1930, and knighted in 1919. An authority on early English texts, he edited *The Pearl*, 1891; *The Exeter Book of Anglo-Saxon Poetry*, 1897, etc.; *The Temple Shakespeare*, 1894-96;



Goliath Beetle of tropical Africa



Sir Israel Gollancz, British man of letters  
Russell

the Caedmon MS., 1927; and was general editor of The Temple Classics, and the King's Library.

**Gollancz**, VICTOR (b. 1893). British publisher and publicist. The son of Alexander Gollancz, he was born in London, April 9, 1893,



Victor Gollancz,  
British publisher  
and publicist

and educated at St. Paul's school and New College, Oxford, where he was Chancellor's prizeman for Latin prose. For some years managing director of Ernest Benn, Ltd., in 1927 he founded

the publishing firm bearing his own name, of which he was chairman and governing director. In 1936 he founded the Left Book Club. He became well known for his support of various humanitarian causes. Among his writings are *The Betrayal of the Left*, 1941; *Russia and Ourselves*, 1941; *Let My People Go*, 1942; *My dear Timothy* 1952, and *More for Timothy*, 1953 (both autobiography).

**Golosh** OR **GALOSH** (Fr. *galoches*). Vulcanised rubber overshoe. An American invention, it was introduced into Great Britain about 1847. Originally golosh signified any kind of boot or shoe, but more especially a wooden clog or patten. The word is ultimately derived from Gr. *kálopodion*, diminutive of *kálopous*, a shoemaker's last.

**Golovnin**, VASILI MIKHAILOVITCH (1776-1831). Russian seaman. In 1805 he commanded a vessel named the *Diana*, with the object of exploring the coastlands of Russia and making a voyage round the world. He was seized and imprisoned for two years by the Japanese (1811-13), but made another voyage. Afterwards he wrote an interesting account of his experiences.

**Goltzius**, HENDRIK (1558-c. 1617). Dutch engraver. He was born at Mühlbrecht in the duchy of Jülich, and died at Haarlem, possibly Jan. 1, 1617. As a painter he never achieved great distinction, but his engravings rank with the best of the German school of the 16th century, showing immense virility and technical skill, although fre-



Hendrik Goltzius,  
Dutch engraver  
Self-portrait

quently erring in taste. He engraved nearly 300 portraits and miscellaneous subjects after his own designs and those of Italian, Flemish, and German masters.

**Gomal** OR **GOMUL**. River and pass of Afghanistan. The river rises some 50 m. S. of Ghazni and winds through the Suleiman Mts. Except in the rainy season, when it flows into the Indus, its waters are lost in the sands. The pass is a route between Afghanistan and India.

**Gomara** OR **KAFFA**. Dependency of Abyssinia. Situated in the S.W., it is noted for its coffee, which takes its name from this district. It is a lofty tableland, watered by the river Omo, and inhabited by people of Hamitic stock.

**Gomberville**, MARIN LE ROY DE (1600-74). French author. His prolix *Polexandre*, with its extravagant adventures and high-flown sentiment, is a typical example of the *roman galant* popular at that time. He was one of the original members of the Academy.

**Gomel**. Town of White Russia S.S.R., capital of a region of the same name. The town, on the river Sozh, 105 m. S.S.E. of Mogilev, is a rly. junction and makes tools, agricultural implements, and clothing; there are also rly. repairing works and a match factory. Gomel region is chiefly agricultural, producing pigs, potatoes, flax, and grain. Peat is worked, and there is some timber milling. Pop. (est.) town, 120,000; region, 700,000.

**Gomera**. One of the Canary Islands, separated from Tenerife (to the E.N.E.) by a channel 13 m. wide. It is 20 m. long, 10 m. broad; area 143 sq. m. Of volcanic origin, with steep coasts, it rises in the interior to an alt. of 4,400 ft. Wooded and well watered, it produces potatoes, fruit, sugar, and cotton. Silk is manufactured, and dromedaries are reared. San Sebastian, the capital and port, has an excellent harbour. Columbus called at the island in 1492.

**Gomez**, JUAN VICENTE (1859-1935). Venezuelan dictator. Born at San Antonio de Tachira, of mixed blood, he was a rancher, and then a soldier. He entered politics in 1892 and played a leading part in the abortive "legalistic" revolution organized by Cypriano Castro (*q.v.*). Fleeing with Castro to Colombia, he remained in exile until 1899, when a successful counter revolution allowed him to return. Having been

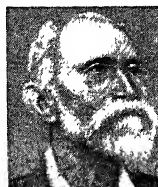
vice-president under Castro, he assumed control of affairs Dec. 19, 1908, and was virtual head of the administration until his death at Caracas, Dec. 17, 1935, though for different periods calling himself president-elect or commander-in-chief. This oppressive rule was marked by extreme cruelty, but he reorganized the country's finances, extinguishing by 1930 the foreign debt; improved legislation, and built universities, hospitals, and a fine system of roads.

**Gomez**, MAXIMO (1836-1905). Leader of Cuban insurgents. Born at San Domingo, Nov. 18, 1836.

his full name was Maximo Gomez y Báez. He drifted to Cuba, where in 1868 he joined the insurgents: ten years later, having taken part in the unsuccessful revolt, he had to seek safety in flight. When affairs between the Cubans and Spain again reached breaking point he returned and, in 1895, was made commander-in-chief of the Cuban forces. In June, 1896, he gained a notable victory at Puerto Principe, and remained one of the three principal leaders of the Cubans until the close of the war, 1898. He strongly opposed the cession of the island to the U.S.A. He died June 17, 1905.

**Gomez Carrillo**, ENRIQUE (b. 1873). Spanish-American author. He was born in Guatemala, his father being a distinguished Spanish historian and his mother of French origin. Early in his career he settled in Paris, and there most of his extraordinary volume of work was achieved. The Spanish world accepts him as a master of prose, and his work is familiar to the readers of the leading Spanish and South American periodicals. He is seen at his best in his numerous works of travel, such as *From Marseilles to Tokyo*, 1905; *The Soul of Japan*, 1906; and *Greece*, 1907. His wife, Raquel Meller, made a great success interpreting Spanish dramatic song.

**Gomme**, SIR GEORGE LAURENCE (1853-1916). British antiquary. Born in London, he was educated at the City of London School. He entered the Metropolitan Board of Works, and was transferred later to its successor, the London County Council. In 1891 he was made statistical officer to the council.



Maximo Gomez,  
Cuban insurgent

and in 1900 became its clerk, resigning 1914. He was knighted in 1911 and died Feb. 23, 1916. Gomme was one of the founders of the Folklore Society, and edited *The Antiquary*, *The Archaeological Review*, and *The Folklore Journal*. His published works include *Primitive Folk Moots*, 1880; *Ethnology in Folklore*, 1892; *The Governance of London*, 1907.



Sir George Gomme,  
British antiquary

**Gomorrhah.** With Sodom, one of the two cities of the plain (Gen. 18, 19). See Abraham; Sodom.

**Gompers, SAMUEL** (1850-1924). American labour leader. Born in London, of Jewish origin, Jan. 27,



Samuel Gompers,  
American labour  
leader

1850, he went to the U.S.A. in 1863. There he soon helped in founding the union of cigar-makers, to which trade he had been apprenticed in England, and laboured incessantly to organize the working classes. A prime mover in 1881 in the formation of the body which in 1886 became the American Federation of Labor, he was its president from 1882, holding this office continuously, apart from a break in 1894-95. This federation drew into itself all the larger unions and did much in carrying reforms through the legislature. Gompers preferred the "craft" principle to Socialism, and denounced all attempts to introduce politics into the policy of American trade unionism. He died at San Antonio, Texas, Dec. 13, 1924. His *Seventy Years of Life and Labor* (2 vols.) appeared 1925.

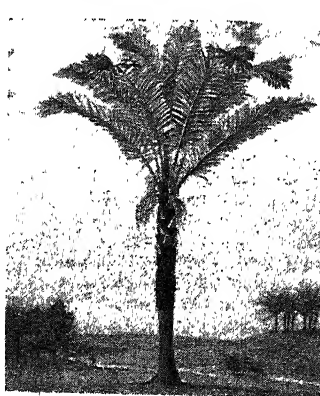
**Gomuti** (*Arenga saccharifera*). Tree of the family Palmae, native of the Moluccas. The trunk grows to about 40 ft., and the large leaves are divided featherwise into long, narrow leaflets. The flower-spikes are male or female, and down among the foliage. The flesh of the large round fruit is acid. Horse-hair-like fibres covering the leafstalks are used for thatching and cordage. The juice of the flower-spikes contains much sugar, and can be converted into toddy or vinegar. Sago can be obtained from the trunk of the tree.

**Gonad.** Generic name for a sex organ, male or female. With the development of the study of gonadotropic hormones, several of them have been isolated. Some are known to be elaborated by the pituitary gland. From the urine of pregnant women is recovered a hormone which has a stimulating effect on the interstitial cells of the male and female sex glands; it also causes the descent of the testis from the abdomen into the scrotum when this is delayed in the adolescent. In the serum of pregnant mares is found another gonadotropic hormone which stimulates the follicles of the ovary and the sperm-forming cells of the testis.

**Gonaïves.** Seaport of Haiti, W. Indies. A prosperous town and a bishop's see on the Bay of Gonaïves, 62 m. N.W. of Port-au-Prince. It has a good harbour and exports coffee, cotton, and dye woods. Here, on Jan. 1, 1804, Dessalines (*g.v.*) declared the independence of Haiti. In 1914 it was the scene of two conflicts between government troops and insurgents. The town was nearly destroyed by an earthquake, May 7, 1842. Pop. 10,500.

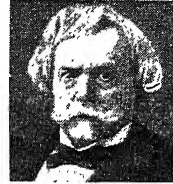
Between Cape S. Nicolas-le-Mole and Cape Dame Marie, the Bay of Gonaïves is about 100 m. across and penetrates inland about the same distance. *Pron.* Gonaïv.

**Gonçalves Dias, ANTONIO** (1823-64). Brazilian poet. Born in Maranhão, Aug. 10, 1823, he was for some time professor at the college of Pedro II in Rio de Janeiro. One of the chief poets of Brazil, he also wrote on ethnographical subjects and compiled a dictionary of Tupi, one of the chief S. American Indian languages. On a voyage home from Europe, he was drowned, Nov. 3, 1864.



Gomuti. A Moluccan palm, yielding fibre, sugar, and sago

**Goncourt, EDMOND DE** (1822-96), and **JULES DE** (1830-70). French novelists, known familiarly as the brothers De Goncourt. They belonged to a Lorraine family. Edmond Louis Antoine Huot was born at Nancy, May 26, 1822; Jules Alfred Huot in Paris, Dec. 17,



Edmond de Goncourt,  
French novelist

1830. Chiefly interested at first in 18th century art and the collection of bric-à-brac, and drawings and pastels of that period — Edmond also became an enthusiastic admirer of Japanese art



Jules de Goncourt,  
French novelist

—they collaborated in books of social history, e.g. *Histoire de la Société Française pendant la Révolution*, 1854; *La Société Française pendant le Directoire*, 1855; *Histoire de Marie-Antoinette*, 1858.

As collaborators in fiction (1860-70) each composed the same incident independently, and the two versions were afterwards moulded into one. Chief of their novels were *Sœur Philomène*, 1861, a hospital story; *Renée Mauperin*, 1864; *Germinie Lacerteux*, a study of the gradual degeneration of a servant, 1865; *Manette Salomon*, a story of a Jewish artist's model, 1867; and *Madame Gervaisais*, 1869, reckoned their masterpiece. The brothers collaborated in a play, *Henriette Maréchal*, 1865; and both kept a diary, reproduced in the much-discussed *Journal*.

Edmond, independently, wrote *Watteau*, 1876; *Prudhon*, 1877; *L'Art Japonaise au XVIIIe Siècle*, 1891-96; and the novels *La Fille Elisa*, 1878; *Les Frères Zemganno*, 1879; *La Faustin*, 1882; and *Chérie*, 1885. He edited *Les Lettres de Jules de Goncourt*, 1885, and the *Journal des Goncourt*, 1887-92.

As writers of fiction the brothers were pioneers of the naturalistic school. Having collected their materials with laborious industry, they attempted to set forth the naked facts of life in a style designed with equal laboriousness to arrest attention by its supposed suitability to subject or situation. Their fiction purports to show

that a life is not a unity but a succession of unrelated incidents. They form a connecting link between Flaubert and Zola. Jules died June 20, 1870; Edmond, July 16, 1896. The money realized by the sale of their art collection was invested to found the Académie des Goncourt, which helps struggling French authors and awards annual prizes. There is a *Life* by A. Delzant, 1889; a monograph by M. A. Belloc-Lowndes and M. L. Shedlock, 1895; consult also *L'Esthétique des Goncourt*, P. Sabatier, 1921.

**Gond.** Primitive tribe in Central India. Numbering over 3,200,000, two-thirds occupy hill-tracts in the Madhya union. The Dhur Gonds, dark-skinned, roundish-headed, thick-lipped peasantry, preserve their aboriginal forest life, ceremonial dances, and animism. The hinduised Raj Gonds on the plains claim Rajput descent. Half of them have displaced their Dravidian speech, intermediate between Tamil and Telugu, by Hindi or Gujarati. Four 14th-17th century Gond kingdoms gave this region the name Gondwana.

**Gonda.** Town and district of India. It is in the Uttar union, in the Faizabad division. Of the total area (2,827 sq. m.) about two-thirds is under cultivation, and of the cultivated area almost half is devoted to rice. Other crops are wheat, maize, and gram. Exports consist principally of agricultural produce; imports include piece goods, salt, and metals. The last raja of Gonda took part in the Mutiny, 1857, and his estates were confiscated. Pop. (1951) dist., 1,877,484; town, 32,566.

**Gondal.** Div. of Bombay, India. Formerly a princely state, it was merged in Saurashtra 1948, itself absorbed in Bombay, 1956. The state was notable for its good educational facilities. Products include cotton, grain, and ground nuts. Textiles and gold embroidery are made.

**Gondar.** Town of Abyssinia, capital of the Amhara prov. of Begemdir. It is built on a hill, at an elevation of 6,000 ft., 24 m. N. of Lake Tsana. At one period a flourishing centre of Abyssinian trade, it had in 1955 an estimated population of 22,000.

In the Second Great War the Italians at Gondar withstood a six months' siege after the capitulation of their main forces in Abyssinia. Their surrender to British Imperial troops on Nov. 27, 1941, brought the campaign in E. Africa

to an end. See Abyssinia; East Africa Campaign.

**Gondokoro.** Town of the Republic of Sudan. It stands on the White Nile, 1,081 m. S. of Khartum. Navigation to Rejaf, 15 m. S.W. and to Khartum, is carried on by the steamers of the government. Here Sir Samuel Baker established a military station in 1871 and called the settlement Ismailia. Formerly a seat of the slave traffic, it had a large trade in ivory.

**Gondola** (Ital.). Long, low, narrow, flat-bottomed boat used on the lagoons and canals of Venice. Both prow and stern curve high off the water; each end is decked, the rowers, or gondoliers, standing up to wield their sweeps. Usually, in the centre is a carriage-like cabin, with doors and curtained windows. The prow is sometimes still decorated with a curious imitation battle-axe head, the last relic of the sumptuous decorations formerly so profusely lavished on gondolas that sumptuary laws were passed in the 16th century to prevent such extravagances. Since that time, as a rule, these vessels have been painted black. (See Venice and illus. under Boat.)

The term has also been used for a boat-shaped car fitted externally to an airship, but this is now usually called a nacelle.

**Gondoliers, THE.** Comic opera in two acts by W. S. Gilbert, music by Arthur Sullivan, with the alternative title *The King of Barataria*. First produced at the Savoy Theatre, London, Dec. 9, 1889, it ran for 554 performances, has been frequently revived, and has remained among the most popular operas in the Gilbert and Sullivan repertory. The scenes are laid in Venice and the imaginary kingdom of Barataria, to the throne of which the extravagances of the plot raise two republican gondoliers. Songs like *The Highly Respectable Gondolier*, *A Regular Royal Queen*, *There Lived a King*, *Take a Pair of Sparkling Eyes*, as well as two dances, *Cachucha* and *Gavotte*, are among the most tuneful and gay of Sullivan's compositions. See Gilbert and Sullivan.

**Gondomar, DIEGO SARMIENTO DE ACUÑA, COUNT OF** (1567-1626). Spanish diplomatist. Born Nov. 1, 1567, of a wealthy Galician family, he was still young when appointed commander of the Portuguese frontier, and helped to repulse the English attacks on the coast. In 1613 he was sent as ambassador to England where he remained, with a



Count of Gondomar, Spanish diplomatist

brief interval, until 1622, a favourite with James I. He furthered the projected match between the prince of Wales (Charles I) and a Spanish infant, and his influence was largely responsible for the execution of Raleigh. Gondomar died in Spain, Oct. 2, 1626.

**Gondwana Beds.** Series of sandstones, shales, ironstones, and coal-seams, of Permo-Carboniferous age, typically developed in India. They contain abundant fossil plants, the "*Glossopteris Flora*," which ranged from Australia through India to Russia, and through Africa to Brazil, marking the former extent of the ancient continent "*Gondwanaland*." Basement bed, the Talchir conglomerate, is notable for huge ice-scratched boulders suggestive of a glacial epoch of Permo-Carboniferous age.

**Goneril.** Character in Shakespeare's tragedy *King Lear*. This proverbially unnatural daughter, the eldest of Lear's three children, and wife of the duke of Albany, having received half her father's kingdom, afterwards refuses him shelter. Having fallen in love with Edmund, bastard son of the earl of Gloucester, and poisoned Regan, her younger sister and rival, she stabs herself to death on finding that her lover has been mortally wounded in a duel with his brother Edgar. See *King Lear*.

**Gone with the Wind.** Novel by the U.S. writer, Margaret Mitchell (1900-49). Pub. 1936, it met with immediate success, and was translated into many languages. The British edition sold 100,000 copies in the first year, and in ten years reached 700,000. The book was over 1,000 pages long; the scene was laid in the Southern states of America at the time of the Civil War, and there were remarkable descriptive passages. The story was filmed in 1939, with Clark Gable and Vivien Leigh as the stars; despite a running time of some four hours the film was enormously popular.

**Gonfalon.** Banner used in the Middle Ages, and formed after the fashion of the *vezillum*, or standard of the Roman cavalry. It consisted of a flag attached to a cross-bar and suspended by cords at right angles to the pole. Though at first a war banner, it subsequently became



Gonfalon. Banner used by medieval cities

both in camp and council. The older form of the word was gonfanon, a corruption of M.H.G. *gundfano*, battle-standard.

**Gong.** In music, a percussion instrument, made of bronze. Of Oriental origin, it is a large round plate in form, with turned-up edges, and is struck by a heavy drum-stick with a hard leather knob, producing a deafening crash of indefinite pitch. Gongs are largely used in Eastern temples.

**Gongora y Argote, Luis DE** (1561-1627). Spanish poet. Born at Córdoba, July 11, 1561, and



Luis de Gongora y Argote, Spanish poet After Velazquez

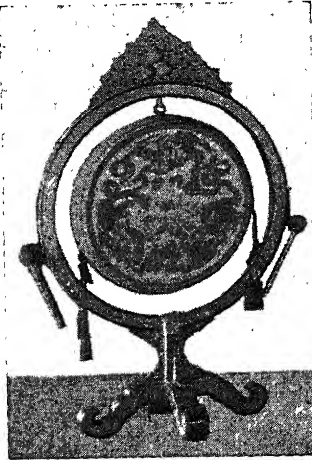
educated at Salamanca university, he began to write poetry when a youth, abandoning the law for which he was trained. Gongora's manner was simple in the first period, but became pompous and extravagant in his middle age, his style giving rise to the term Gongorism. Late in life he entered the Church, and lived in Madrid, becoming chaplain to Philip III, and the friend of nobles and hidalgos. Lope de Vega was an enthusiastic admirer of Gongora's poetry. The latter died at Córdoba, May 23, 1627. His Solitudes were translated into English verse by E. M. Wilson, 1932.

**Goniatites.** Extinct forms of shells, belonging to the class Cephalopoda (*q.v.*). The shells are spirally coiled and divided into chambers connected by a delicate tube, similar to the existing nautilus. They are common in Devonian rocks.

**Goniometer** (Gr. *gonia*, angle; *metron*, measure). Instrument used for measuring the angles of crystals. One form, the contact goniometer, consists of a graduated semicircular arc, to the centre of which a pair of adjustable slotted bars provided with straight edges are pivoted so that they can be fixed at any angle by a screw.

The reflecting goniometer, an instrument of far greater precision, determines the angle between any two faces on a crystal, by obtaining the reflection of light from a collimator from each of the two faces in succession.

Special goniometers measure growing crystals and cut accurately



Gong. Japanese instrument from a temple at Nikko

plates and prisms from crystals, including precious stones. See Crystallography.

**Gonorrhoea** (Gr. *gonos*, seed; *rhoia*, flux). A venereal disease caused by the gonococcus. Of great antiquity, it may be the complaint referred to as an "issue" in Leviticus. It affects particularly the sexual organs of adults and of young girls and the eyes of the newly born. The rectum in either sex may be attacked.

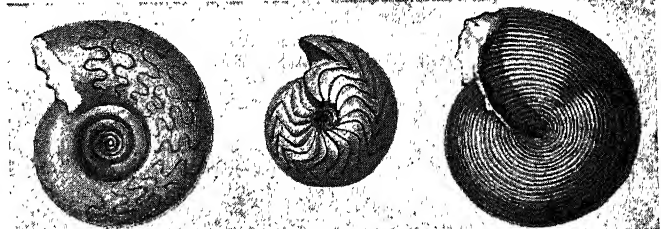
In the male the symptoms begin usually 2-8 days after intercourse with an infected woman, and consist of a light itching and burning at the tip of the genital organ, followed by a purulent urethral discharge. Complications may occur in neglected or inadequately treated cases; they include a painful swelling of the testis (epi-

didymitis) which, if bilateral, may lead to sterility; inflammation of the prostate (prostatitis) with perhaps retention of urine; swollen painful joints, with or without inflammation of the eyes. Later may appear a chronic, thin, watery discharge, or gleet, which, though mild in itself, may still transmit the disease.

In the female, gonorrhoea is often less obvious, as the nature of the discharge is not always realized by the patient. The urethra is generally attacked; the neck of the womb commonly (cervicitis). Complications include a painful vulvar abscess (bartholinitis); inflammation of the Fallopian tubes accompanied by severe abdominal pain (salpingitis) which may lead to sterility; less often, rheumatic complications as in the male.

Diagnosis in both sexes can be undertaken only by a doctor and is made by the examination of stained smears of the discharges and also by growing the organism in the laboratory. It is illegal for other than qualified medical practitioners to treat the disease. Cure may be effected by injections of penicillin, though the patient of either sex must remain under observation for some months to ensure that the cure is complete.

Infants of infected mothers may themselves contract infection of the eyes while being born (gonococcal ophthalmia, *ophthalmia neonatorum*). This distressing condition, at one time responsible for much blindness, is now almost totally avoided by the routine practice of nurses and midwives, involving the use of a silver derivative. Young girls may contract genital infection by contact with infected parents or attendants, through clothing, towels, etc., or in lavatories. They usually complain of soreness, and a vaginal discharge will probably be evident on the underclothing. Discharges in all forms may by contact affect the eyes of healthy persons, leading



Goniatites. Left to right, *Pronorites cyclobolus*, *Glyptoceras sphaericum*, both from Carboniferous limestone in England; *Agathiceras Suesi*, from Permo-Carboniferous in Sicily  
British Museum

to serious inflammation. For adults prevention really lies in abstaining from casual sexual relationships. See Syphilis.

**Gonsalvo de Córdoba.** Name by which the Spanish soldier Gonzalo Hernandez y Aguilar (1453–1515) is usually known. A younger son of the count of Aguilar, he was born at Montilla, near Córdoba, March 16, 1453. In 1495 Ferdinand and Isabella chose

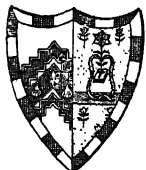


Gonsalvo de Córdoba,  
Spanish soldier

Gonsalvo to command the force sent by them to help Ferdinand of Naples against the French. He remained there until 1498, driving the French from Naples.

In 1501 he returned to Italy to help the French. The allies, however, soon quarrelled, and Gonsalvo's victories, like his first, were over the French. His great achievements were at Cerignola (1503) and on the Garigliano (1504). His influence was strong on the military leaders of the 16th century. He died at Granada, Dec. 2, 1515.

**Gonville and Caius College.** The official name of the college at Cambridge University usually



Gonville and Caius  
College arms

known as Caius (*pron.* Keys). In 1348 Edmund Gonville, rector of Terrington, Norfolk, founded the Gonville Hall, near S. Botolph's Church; his executor, Bishop Bateman, in 1351 removed the college to its present site near Trinity Hall, and called it the Hall of the Annunciation. In 1557 John Caius (*q.v.*) by royal charter refounded the society under its existing name.

The three portals through which the college was entered were named by Caius the gates of Humility, Virtue or Wisdom, and Honour. The first-named gate, removed in 1868, is in the garden of the master's lodge. The much-admired Gate of Honour, leading

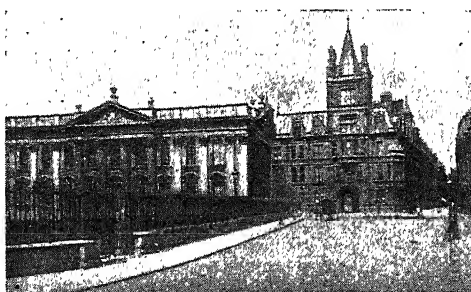
into Senate House passage, was designed by Caius. The exterior of the chapel, built c. 1393, was cased with freestone in 1716–26. With the college are associated the names of William Harvey, John Cosin, Jeremy Taylor, Edward Thurlow, Thomas Gresham, J. Hookham Frere, and John Venn. The society includes a master and 21 fellows on the older foundations.

**Gonzaga.** Name of a princely Italian family which ruled over Mantua from 1328 to 1708. Its members also held the marquise of Montferrat from 1536, and later the duchies of Guastalla and Nevers. It included many distinguished soldiers, notably Giovanni Francesco II (d. 1444); two cardinals, Ercole (1505–63), an active ecclesiastical reformer, and Scipione (1542–93), a patron of letters; and Luigi (1568–91), who was canonised as S. Aloysius (*q.v.*).

Giovanni Francesco III (d. 1519), the husband of Isabella d'Este, was a soldier and a collector of art treasures. Under his son Federigo II (d. 1540) the court of Mantua was famous. A struggle between two branches of the family, the dukes of Nevers and Guastalla, for Mantua, France supporting the former, and Spain and Austria the latter, brought about civil war (1627–30).

The end came in 1708 when Ferdinand Charles IV was deposed by the emperor Joseph I, and died in exile without issue. Austria then annexed Mantua and Savoy took Montferrat. The Guastalla branch of the family became extinct in 1746.

**Gonzaga, THOMAZ ANTONIO** (1744–1809). A Portuguese poet. Born at Oporto, he was educated at the university of Coimbra, and in 1768 went to Brazil and became a judge of the appeal court at Bahia. In 1785 he was arrested, and later banished to Mozambique, on a charge of conspiracy.



Gonville and Caius College, Cambridge, with the Senate House on the left

His love lyrics and pastorals, *A Marilia de Dirceo*—Dirceo being his pen-name and "*Marilia*" the lady he married—enjoyed great popularity. They were edited, with a Life, by J. da Sylva, 1845.

**Gooch, SIR DANIEL** (1816–89). British engineer. Born at Bedlington, Northumberland, Aug. 16,



Sir Daniel Gooch,  
British engineer

1816, he began as an iron-worker at Tredgar, and later became associated with the Stephensons and other pioneers in railway construction. His life work was done on the G.W.R. as locomotive superintendent, 1837–64; he made remarkable improvements in its engines. In 1866 he returned to the G.W.R. as chairman, and, holding this position for 23 years, brought the line from a position bordering on bankruptcy to a high pitch of prosperity. Gooch superintended the laying of the Atlantic cable, 1865–66. He was made a baronet in 1865, and died Oct. 15, 1889.

**Gooch, GEORGE PEABODY** (b. 1873). British historian. Educated at King's College, London, and Trinity College, Cambridge, he represented Bath as Liberal M.P., 1906–10. One of the chief authorities on modern German history, his books included *Franco-German Relations, 1871–1914*; *History of Modern Europe, 1878–1919* (published 1923); *Recent Revelations of European Diplomacy*; *Frederick the Great, 1947*. Others of his copious publications are *Annals of Politics and Culture*; *History and Historians in the 19th Century*; *Studies in Diplomacy and Statecraft, 1944*. Gooch, who was made C.H. in 1939, was joint editor of *The Contemporary Review*; *Cambridge History of British Foreign Policy*; *British Documents on the Origins of the War, 1898–1914*.

**Gooch Crucible.** Cup of glazed porcelain having a bottom perforated with fine holes for filtration under suction. Finely divided asbestos in suspension is poured into the crucible to form a thin pad on the bottom. The crucible is then attached to a vacuum flask in which low pressure is maintained by a filter pump.

**Goodall, FREDERICK** (1822–1904). British artist. The son of an engraver, he was born Sept. 17, 1822. He studied art and soon



began to paint, exhibiting his first picture, Card Players, at the Royal Academy in 1839. In 1853 he was elected A.R.A. and in 1863 R.A. He died July 28, 1904. Many of Goodall's pictures have Egypt and the desert for their scene. They include Hagar and Ishmael, Rachel and Her Flock, The Return from Mecca, and The Finding of Moses.

**Good Conduct Medal.** British medal instituted by William IV in 1830 for award to soldiers of irreproachable character who had served for 21 years in the infantry, or 20 years in the cavalry. The design of the medal and the conditions of its award were subsequently altered, and in 1902 its title was changed to Long Service and Good Conduct Medal (*q.v.*). A similar medal was instituted in 1831 for petty officers and ratings of the Royal Navy completing 21 years' service with good conduct; this, too, was replaced by the Long Service and Good Conduct Metal (Navy).

**Goodenough Medal.** A prize founded in memory of Captain J. G. Goodenough, R.N. (1830-75), who died Aug. 20, 1875, from wounds inflicted with poisoned arrows by the natives of Santa Cruz. The fund consists of a sum of about £800, with the interest on which a gold medal is presented yearly to the sub-lieutenant who has taken a first class in seamanship, and in the examination for lieutenant passes first in gunnery.



J. G. Goodenough,  
British sailor

**Good Friday** (*Gr. Pascha Staurosímon*, Pasch of the Cross; *paraskeuē*, Holy Friday; *Lat. dies absolutiois*). Name given in the R.C. and Anglican Churches to the Friday in Holy Week (*q.v.*) on which the Crucifixion is commemorated. In England, to which the name was for a long time peculiar, it superseded that of Long Friday, an allusion to the fast. The name *pascha*, afterwards appropriated to Easter (*cf. Acts 12, v. 4*), derives from the association of the day with the time of the Jewish Passover (*Heb. pesach*).

In the Anglican Church special collects, epistle, gospel, lessons, and psalms are appointed for the day, which is frequently observed by the Three Hours service, from noon to 3 p.m., during which the attention of the congregation is specially directed to the Seven

Last Words: it was for this service that Haydn's Seven Words from the Cross was written. Among old English customs was the royal blessing of cramp rings for prevention of the falling sickness.

In the R.C. Church the altar is at first bare, no candle is lighted, and the officiating priests wear black vestments. After the altar has been covered with a white cloth and special prayers have been said, there follows The Adoration of the Cross. Communion is forbidden except in case of sickness. In the R.C. and Greek Churches, for the ordinary Mass the Mass of the Presanctified is substituted; in this the priest receives as communion a Host (*q.v.*) consecrated on the previous day. The Roman office *Tenebrae* (*Lat.*, darkness) observed on the Wed., Thurs., and Fri. of Holy Week, is so called from the gradual extinction of the lights in the church during the service, in commemoration of the darkness that covered the earth at the time of the Crucifixion. For this office, which is used in some Anglican churches, music has been composed by Palestrina, Salvatore, Michael Haydn, and others. In England Good Friday is in many ways observed as a Sunday.

**Goodhart, ARTHUR LEHMAN** (b. 1891). American legal authority who became Master of University College, Oxford. Goodhart was born in New York city on March 1, 1891, and educated at Hotchkiss School, Yale University, and Trinity College, Cambridge. After two years, 1915-17, as assistant corporation counsel for N.Y. city, he served in the U.S. forces 1917-19, and, settling in England, was University lecturer in law at Cambridge, 1919-31, and professor of jurisprudence at Oxford, 1931-51; in 1938 he became an hon. bencher of Lincoln's Inn. and in 1943 took silk.

He was created (hon.) K.B.E. in 1948, and in 1951, although still retaining his American nationality, was appointed Master of University College, Oxford. Editor of the Law Quarterly from 1926, he was deeply interested in promoting road safety, being president of the Pedestrians' Association for Road Safety from 1950. He was made F.B.A. in 1952. Among his



Arthur Goodhart,  
U.S. legal authority

publications were *Precedent in English and Continental Law*, 1934; *The Government of Great Britain*, 1946; *English Law and the Moral Law*, 1953.

**Good Hope, CAPE OF.** The S.W. extremity of Africa is described under Cape of Good Hope.

**Good King Henry** (*Chenopodium bonus-henricus*). A common British perennial herb, from 1 to 3 ft. high, the large, dark green succulent leaves of which are sometimes used as a substitute for spinach. It bears small, greyish flowers in spikes, May to Aug.

**Good Neighbour Policy.** Phrase coined by President F. D. Roosevelt when addressing the Pan-American Conference at Buenos Aires on Dec. 1, 1936. The conference was representative of all nations of the American continent except Canada, and its keynote was struck by Roosevelt's declaring that the U.S.A. interprets the role of "good neighbour" as one forbidding a nation to interfere forcibly in the affairs of another. See Pan-American Conference.

**Good Parliament.** Name given to the parliament that met in April, 1376. To reform the gross mismanagement of national affairs towards the end of the reign of Edward III, the commons resolved to withhold all grants until their grievances were redressed. Through Sir Peter de la Mare, who thus founded the office of Speaker, they presented a list of petitions to the king, set up a council of 12 peers to advise the sovereign, and imprisoned and deprived of their lands two of his ministers, Lords Latimer and Lyons, who had been guilty of corruption and general malpractice. The parliament, which was dissolved July 6, hold an important place in British constitutional history.

**Goodrich Castle.** Ruined castle of Herefordshire, England. It stands on the right bank of the Wye, above the village of Goodrich, 3 m. W. of Ross. The remains include a gateway and ruins of two towers, the keep, and the chapel. There was a fortress here as a defence against the Welsh before the Norman Conquest; but the existing ruins are of later date. The keep dates from Henry II's time. The castle was once held by the earls of Pembroke, to which family it was given by Henry III; afterwards it passed to the Talbots, earls of Shrewsbury. It was held for Charles I during the Civil War, but after a siege lasting eighteen weeks the parliamentarians captured it in 1646, and dismantled

it. There is an interesting old church in the village, near which is Goodrich Court, a modern residence formerly containing a noted collection of armour.

**Good Templars, THE INTERNATIONAL ORDER OF.** Society for the purpose of inculcating total abstinence and abolishing the sale of alcoholic liquors. Founded in Utica, New York, in 1851, it spread rapidly in N. America, and in 1868 was introduced into Great Britain by Joseph Malins. The ritual, which is secret, and contains passwords and signs, was translated into 18 languages, and the society established lodges throughout the British colonies and in most European countries. Organized in lodges, it has British headquarters at Birmingham. The international membership of the order in 1949 was 300,681. See Friendly Societies.

**Goodwill.** Term used for the advantages, other than the material assets, buildings, furniture, etc., which go with a business or profession. It is regarded as property, and stamp duties must be paid when it is transferred from one person to another. It is also valued for death duties, and, moreover, a person is entitled to compensation if the goodwill of his business is injured. Lord Lindley defined goodwill as "the benefit arising from connexion and reputation," and its value "what can be got for the chance of being able to keep that connexion and improve it." It frequently includes the name of a business. The Landlord and Tenant Act, 1927, provides for compensation for loss of goodwill by tenants compelled to give up possession of premises at which they have carried on a business.

**Goodwin, THOMAS (1600-80).** English puritan divine. He was born at Rollesby, Norfolk, Oct. 5, 1600, and educated at Cambridge, where he became a university preacher. Owing to disputes with his bishop, he resigned, and was for a time a pastor at Arnhem, Holland. Having returned to England in 1640, he preached with success in London, and became a member of the Westminster Assembly, 1643.

A friend and confidant of Oliver Cromwell, whose deathbed he attended, he preached often before the house of commons. From 1650 until the Restoration, when he was deprived of the office, he was pres. of Magdalen Coll., Oxford. At his death, Feb. 23, 1680, he was pastor of the independent church, Fetter Lane, London.

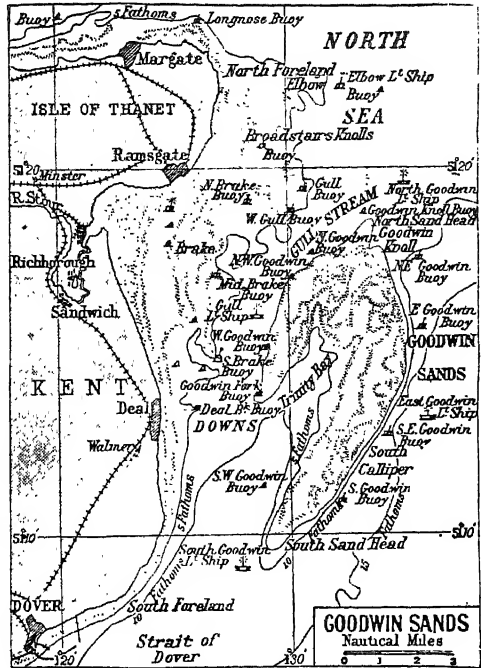
**Goodwin Sands.** Dangerous sandbanks off the E. coast of Kent, England. They extend from N. to S. for 10 m., about 6 m. from the mainland. They form a natural protection to the anchorage of the Downs, but themselves have been the scene of many shipwrecks. At low water they rise some feet above sea level, whereas at high water they lie 15 ft. below the sea. The extreme limits of the shoal are marked by four light-vessels, whose flashing lights are visible at a distance of 12 m. The sands are named after Earl Godwin (q.v.).

**Goodwood.** Sussex residence of the duke of Richmond and Gordon. It is  $3\frac{1}{2}$  m. N.E. of Chichester. The

mansion was erected during the first half of the 18th century, and the grounds are celebrated for their magnificent cedars.

**Goodwood Races.** An English horse race meeting, held on the South Downs in Goodwood Park, Sussex. It takes place over four days beginning on Tues. at the end of July. The Stewards' Cup is the principal event. This meeting, inaugurated 1802, is a fashionable occasion. The airfield adjoining the horse-racing course built during the Second Great War became a motor-racing track 1948.

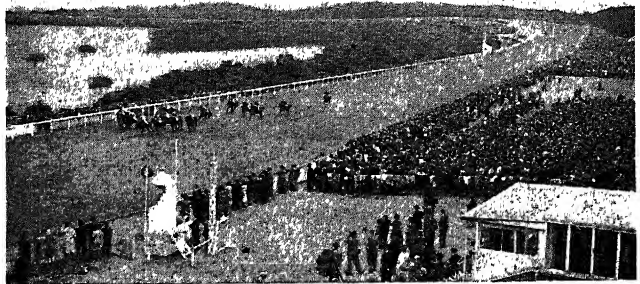
**Good Words.** English monthly illustrated religious magazine. Established in 1860 by Alexander



Goodwin Sands. Chart of the dangerous sandbanks off the east coast of Kent, England

Strahan, and published at 6d., its first editor was Norman Macleod, on whose death in 1872 Donald Macleod became editor. Its writers and illustrators included many eminent men and women. It later passed into the hands of Isbister and Co., from whom it was acquired by The Amalgamated Press, and issued as a penny weekly. In 1911 it was amalgamated with The Sunday Companion.

**Goodyear, CHARLES (1800-60).** American inventor. Born at New Haven, Conn., Dec. 29, 1800, the son of a hardware manufacturer,



Goodwood Races. The field towards the finish of the Stewards' Cup, 1948, which was won by Commissar

he devoted himself to experiments in the treatment of rubber which would make it impervious to extremes of temperature. By accident in 1839 he discovered the process of vulcanisation. He died in New York, July 1, 1860. The tire and rubber company founded by Goodyear later made balloons for the U.S. forces and, after acquiring Zeppelin rights in 1924, rigid airships and blimps. See Airship.

**Goofah.** Circular boat used on the Tigris and Euphrates rivers. Similar to the coracle (*q.v.*), the goofah is 6 ft. in diameter, woven from willow twigs and covered with bitumen to render it watertight. According to tradition, Moses was cradled in a goofah. See Boat; also illus. p. 1242.

**Googly.** In cricket, a ball which comes in towards a batsman (right-handed) from the offside, but is delivered with a leg-break action. B. J. T. Bosanquet is credited with the invention, and South African bowlers became exponents of the googly before the First Great War.

**Goole.** Borough, market town, and inland port of the W. Riding of Yorkshire, England. It stands on the confluence of the Ouse and Don (here canalised and known as the Dutch River), on the E. edge of the Yorkshire coalfield. It is served by rly. and has extensive docks; canals link it with the industrial parts of the W. Riding. Boothferry Bridge, the principal crossing of the Ouse, stands at the N. boundary. There are regular services by sea between Goole and Scandinavian and other Continental ports and an extensive coastal trade. Its industries include shipbuilding, flour milling, and clothing and fertiliser making.

In an agricultural district, it is a market town. The chief building is the church of S. John; there are a free library and market hall. Goole gives its name to a constituency. Pop. (1951) 19,227.

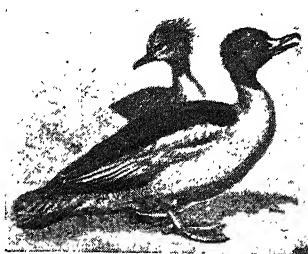
**Goora Nut.** Seed of an evergreen tree (*Cola acuminata*) of the family Sterculiaceae. It is a native of tropical Africa. The tree is about 40 ft. high and has large, leathery, oblong leaves, pointed at each end, and sprays of pale yellow flowers. The seeds, about the size of horse chestnuts, are contained in pod-like follicles. They are used as a condiment, a small piece also being chewed before a meal to improve the



Goora Nut. Foliage, flowers, and seeds (also in section) of an African tree

flavour of the viands. Goora is said to make half-putrid water drinkable.

**Goosander** (*Mergus merganser*). Diving duck. It visits the north of Scotland, and occasionally breeds there, feeding almost entirely on living fish. The male is black on the back and white beneath, with a greenish head, red beak, and pinkish breast, and is about 26 ins. long. In winter it migrates to Southern Europe and Asia. The



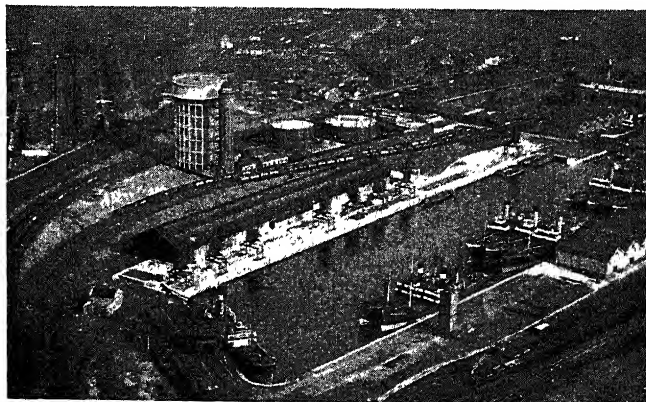
Goosander. Specimen of *Mergus merganser*, a diving duck

name is probably an abbreviation of goose-gander, as merganser of Lat. *mergus*, diver; *anser*, goose.

**Goose.** Name applied rather indefinitely to various genera of the order Anseriformes, which includes also ducks and swans. Some of these genera are so closely connected by intermediate forms with swans and ducks that it is difficult to indicate any clear line of demarcation. About 40 species are called geese; but the typical geese are usually restricted to eleven species. Broadly speaking, geese are smaller than swans, and, with certain exceptions, larger than ducks. Their necks are shorter than the body and their beaks are never longer than the head. They are heavy, strong birds, much less aquatic in habit than either ducks or swans. Of British wild geese, the grey lag (*Anser anser*) and the bean goose (*A. fabalis*) are the best known, the former breeding in the N. of Scotland and Ireland. But British wild geese are mostly winter visitors, retiring farther N. in spring for nesting.

The domestic goose is descended from the grey lag, with which it will interbreed, and was evidently domesticated at an early period, as some of the oldest Sanskrit writings mention it, and an ancient Egyptian painting represents the cramming of a goose by hand. In Great Britain it has long been bred on a large scale, the common land being utilised for the purpose. Before steel pens were invented, goose quills were in great demand. The down is still a valuable article of commerce.

The domestic goose has been greatly developed in size by selective breeding. Its ancestor, the grey lag, weighs about 8 lb., but a fine specimen of a good modern strain may scale 25 lb. As a producer of eggs the goose is unimportant, there being hardly any market for them. Of the various domestic strains, the Emden and Toulouse are those usually kept. The former is the Michaelmas



Goole, Yorkshire. View taken from the air of the extensive docks at this inland port which lies just within the West Riding

goose, while the latter is the favourite bird for Christmas, as it attains great weight. A tailor's goose is a name given to the large flat iron used by tailors and so named from a resemblance to the neck of a goose. See Brent-goose; Poultry.

**Gooseberry.** Fruit of a shrub of the family Saxifragaceae and genus *Ribes*. *R. grossularia* is the parent species, but varieties are numerous.

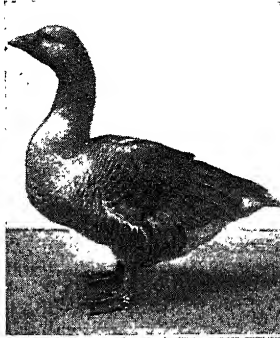
No bush fruit is more profitable or easily grown than the gooseberry. The bushes will flourish in sunny or partially shaded places; planted in the spaces between young fruit trees, they will be remunerative for years. To do really well they must be grown in soil which has been dug about 20 ins. deep and manured. An annual top-dressing of stable manure, hop manure, or compost heap material on the soil in autumn or early spring is beneficial.

Bushes should be planted in autumn 5 ft. apart. The less severely they are pruned the better crops will they produce. In winter, branches and shoots that cause overcrowding should be cut out; in summer, long side shoots ought to be shortened. Cordon gooseberries with one, two, or three stems yield fine fruits; they are grown against a wire trellis or wall. Propagation is by cuttings 10-12 ins. long, inserted out of doors in autumn; the cuttings should be half covered with soil. All buds except the uppermost five must be removed. There are numerous varieties with white, green, red, or yellow fruits.

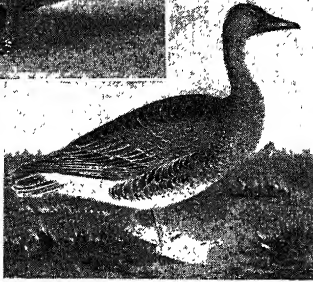
Gooseberries are liable to damage by caterpillars of the magpie moth and gooseberry saw-fly. See Gooseberry Caterpillar.



Gooseberry, the fruit and leaves



Goose. Bean goose, a British wild species. Top, Toulouse goose



magpie moth (*Abraxas grossulariata*) and a saw-fly (*Pteronurus ribesii*). Both feed on the leaves of the gooseberry and do great damage in spring and early summer.

The saw-fly larvae make their appearance soon after the leaves have expanded in the spring and, if not cleared off, soon destroy all the foliage. The caterpillars of the moth result from eggs laid in July or Aug., but as they go into hibernation before becoming full-grown, these also put in an early appearance. As both these insects are warningly coloured, in white, yellow, orange, and black, birds do not molest them. Sprays containing derris or lead arsenate are effective controls. If the latter be used, a month should elapse between dates of spraying and picking. With few bushes, hand picking of the caterpillars is the best method.

**Goosefoot** (*Chenopodium*). A genus of annual and perennial herbs. Of the family Chenopodiaceae, they are natives of all climates, mostly occurring on seashores or in cultivated land. Mostly weeds, some species are, or have been, used as pot-herbs, such as Good King Henry (*C. bonus-henricus*), formerly widely cultivated as a substitute for asparagus and spinach. *C. ambrosioides* of tropical America is the so-called Mexican-tea, whose essential oil causes it to be used as a tonic and anti-spasmodic medicine. *C. quinoa* is cultivated in Chile and Peru, its seeds being employed as food and medicinally.

formed is the best treatment. One gallon of lime-sulphur is used to 29 gallons of water.

**Gooseberry Caterpillar.** Name applied loosely to the larvae of the

**Goose Grass.** A common name for the weed described and illustrated under Cleavers.

**Goose Land** (Russ. Gusinaya Zemlya). S.W. division of Novaya Zemlya. Situated on the W. coast of the South island, it projects into the Arctic Ocean between N. and S. Goose capes. It is also known as Willoughby's Land.

**Goose Step.** Popular name of the German military exercise called the balance step, used on ceremonial occasions. The body is balanced upon one leg, while the other is advanced slowly without a jerk, the knee straight, the toe pointed outwards, and the shoulders square to the front. The advanced leg is then placed firmly on the ground and the weight of the body thrown upon it, while the other leg is advanced in the same fashion, both knees being kept quite straight. The march is in slow time, 75 paces to the minute. During the First and Second Great Wars, German infantry invariably goose-stepped into occupied towns.

In 1938 Mussolini introduced the step into the Italian army, re-



Goose Step. Nazi standard-bearers parading past Hitler at a party congress, Nuremberg

christening it the Roman step. Neither the goose step nor the Roman step should be confused with the ceremonial slow march practised by the British army and R.A.F. at funerals and when trooping the colour on the sovereign's birthday.

**Goossens.** Name of a family of British musicians. Eugène (1845-1906) was born at Bruges, Feb. 25, 1845, and coming to England in 1873, was conductor with the Carl Rosa opera company for ten years. He founded the Goossens male voice choir at Liverpool, where he died, Dec. 30, 1906. His son Eugène, born at Bruges, Jan. 28, 1867, likewise came to England in 1873, and was a violinist at Covent Garden and conductor of several opera

companies, notably Carl Rosa, 1899-1915, and the British National from 1926.

(Aynsley) Eugène Goossens, born in London, May 26, 1893, was educated at Bruges conservatoire and the London R.C.M. Violinist at Queen's Hall in 1911, he became associated with Sir Thomas Beecham, conducting the London symphony, Philharmonic, and B.N.O.C. orchestras. In the U.S.A. from 1923 he conducted the Rochester Philharmonic and directed the Cincinnati symphony orchestras. Conductor of Sydney symphony orchestra and director of N.S.W. conservatoire 1947-56, he was knighted in 1955. His compositions include chamber music, songs, orchestral pieces, and an opera, Judith. He published an autobiography 1951. A brother Léon became a famous oboe performer: his sisters Sidonie and Marie Goossens were celebrated harpists.



SIR EUGENE GOOSSENS.  
British conductor  
and composer

**Gopeng Beds.** Series of pale grey clays and boulder clays, developed in Kinta district, Malay Peninsula, and probably of Permian-Carboniferous age (*q.v.*). They contain tin ore, and are associated with granite, phyllite, quartzite, and crystalline limestone.

**Gopher** (*Geomys*). Genus of small rodents. They are sometimes regarded as belonging to the same group as rats and mice; others place them among the squirrels. The European gopher is known as the suslik, and is common in Central and E. Europe and Siberia. Its fossil remains have been found in the Thames valley. It somewhat resembles a squirrel without the tufted ears and long tail, and lives in burrows in which it hibernates during winter. It feeds on seeds and roots, and occasionally on birds and mammals.

**Gopher Wood.** Material of which, according to the Bible narrative, the ark built by Noah was constructed (Gen. 6). The weight of authority favours its identification with the cypress (*q.v.*).

**Göppingen.** Town of Germany, in Württemberg. Situated on the right bank of the Fils, it is 26 m. N.W. of Ulm. Most of the town was rebuilt after a disastrous fire in 1782, and it has woollen, paper, leather, chemical, and metal manufactures and a mineral

spring. The principal building is the old castle erected by Duke Christopher in the 16th century, possessing a fine spiral stone staircase. Pop. 23,314.

**Gorakhpur.** City, district, and division of the Uttar Union, India. Area, div., 9,563 sq. m.; dist., 4,524 sq. m. About three-quarters is under cultivation; of the cultivated area almost half is devoted to rice. Leopold Amery was born in the city, which stands on the Rapti. Pop., div., 7,972,108; dist., 3,963,574; city, 98,977—a large majority in all being Hindus.

**Goral.** Ruminant mammal placed by zoologists between the goats and the antelopes. Found only in the Himalayas, it somewhat resembles a goat with very short horns and no beard. It stands about 27 ins. high at the shoulder, and is brown in colour



Goral. A Himalayan ruminant resembling a goat

with black stripes down the back and on the front of the legs. It is usually found in small herds.

**Gorbals.** Suburb of Glasgow, Scotland. It is on the S. side of the Clyde, and is served by trams and buses from the centre of the city. The chief buildings are its parish church in Carlton Place, once a residential district, theatres, and the public library. The centre of the district is Gorbals Cross. Gorbals was a separate burgh until incorporated with Glasgow in 1846; it gives its name to a burgh constituency. A ballet, *Miracle in the Gorbals*, by Helpmann, was produced at the Princes Theatre, London, 1944.

**Gorboduc.** Tragedy by Thomas Sackville (afterwards earl of Dorset) and Thomas Norton. It was first acted by the gentlemen of the Inner Temple before Queen Elizabeth, Jan. 18, 1562. It is the earliest example of English tragedy. Gorboduc, king of Britain, divides the kingdom between his sons, whose quarrels lead to a

wholesale killing off of the characters. Gorboduc was printed in 1570 as Ferrex and Porrex. There is a modern edition by L. Toulmin Smith, 1883.

**Gordian.** Name of three Roman emperors, father, son, and grandson. Antonius Gordianus Africanus (159-238), a kinsman of the emperor Marcus Aurelius, after holding the offices of aedile, praetor, and consul, in 232 became proconsul of Africa. Having gained the affection of the inhabitants, he was invited to assume the throne by a body of rebels who had revolted against Maximinus (*q.v.*). This he did with great reluctance in 238, being nearly 80 years of age. Duly recognized by the senate, he associated his son (192-238) with him as joint-emperor. The governor of Mauretania refused to recognize them, and in an engagement near Carthage the younger Gordian lost his life, whereupon the father committed suicide.

After the brief joint reign of Balbinus (*q.v.*) and Pupienus (*q.v.*) which ended in the murder of both, the son of the younger Gordian, a mere boy, was proclaimed emperor by the soldiery as Gordian III. He proved a capable general, but a succession of victories was cut short by his death. His successor in command, Marcus Julius Philippus, incited the soldiery against Gordian who was murdered in a mutiny, 244.

**Gordian Knot.** In Greek legend, a knot of bark made by Gordius of Phrygia to fasten the pole to the yoke of his wagon, which was preserved in the acropolis of Gordium. An oracle declared that whoever should loose the knot would be ruler of Asia. Alexander the Great fulfilled the oracle by cutting the knot. "Cutting the Gordian knot" has become proverbial for prompt dealing with a baffling problem.

**Gordium.** Ancient capital of the Phrygian kings Gordius and Midas (8th-7th centuries B.C.). It lay near the Sangarius r., S.W. of modern Ankara; on its site stands Yassihöyük, Turkey. Excavations were carried out here from 1952. Large tumuli, ascribed to the royal dynasty, were found to contain rich burials.

**Gordon.** Name of a Scottish family. Its head is the marquess of Huntly, another branch being represented by the marquess of Aberdeen. Aberdeenshire is their special area, but there are many Gordons all over Scotland



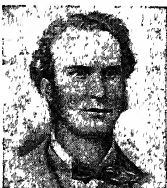
and many bearers of the name have distinguished themselves. It is perpetuated, moreover, by the Gordon Highlanders.

Gordon is supposed to be taken from Gorden, in Berwickshire, where a certain Norman settled in the 11th century, and took the name. His descendant, Adam Gordon, obtained from Robert Bruce, Strathbogie, in Aberdeenshire, the castle of which was long the family residence. He called this Huntly, after a place on his estate in Berwickshire. He was killed in battle in 1333. His lands in Berwickshire and Aberdeenshire passed down in the direct line until they came to Sir Adam Gordon, who had no sons. His daughter, Elizabeth, married Sir Alexander Seton, who then became lord of Gordon, their descendants taking the name of Gordon. From one of them, made earl of Huntly in 1450, come the earls and marquesses of Huntly.

A dukedom of Gordon was in existence from 1684 to 1836, being held by the marquesses of Huntly. The 4th marquess was created duke of Gordon in 1684; both he and his son, the 2nd duke, were Jacobites. The 3rd duke was the father of Lord George Gordon. Alexander, the 4th duke, was the husband of Jane Maxwell, the duchess of Gordon of whom many stories are told. Described as the greatest subject in the country, he was made earl of Norwich in 1784. His son George, the 3rd duke, who was known as a soldier, left no sons when he died in 1836, and the dukedom became extinct. His heiress, his sister, Charlotte, married the duke of Richmond, who took the additional name of Gordon, and in 1876 a later duke of Richmond was given the additional title of duke of Gordon.

Gordon Castle, near Fochabers, was the chief seat of the dukes of Gordon until their extinction. It is a large quadrangular building, built in the 18th century, and passed in 1836 to the duke of Richmond. An exhaustive account of the house of Gordon was edited by J. M. Bullock, 1903.

**Gordon, ADAM LINDSAY** (1833-70). Australian poet. Born at Fayal, in the Azores, and educated at Cheltenham and Merton College, Oxford, he left England in 1853 for S. Australia, where he became successively trooper in the mounted police, horse-



A. Lindsay Gordon,  
Australian poet



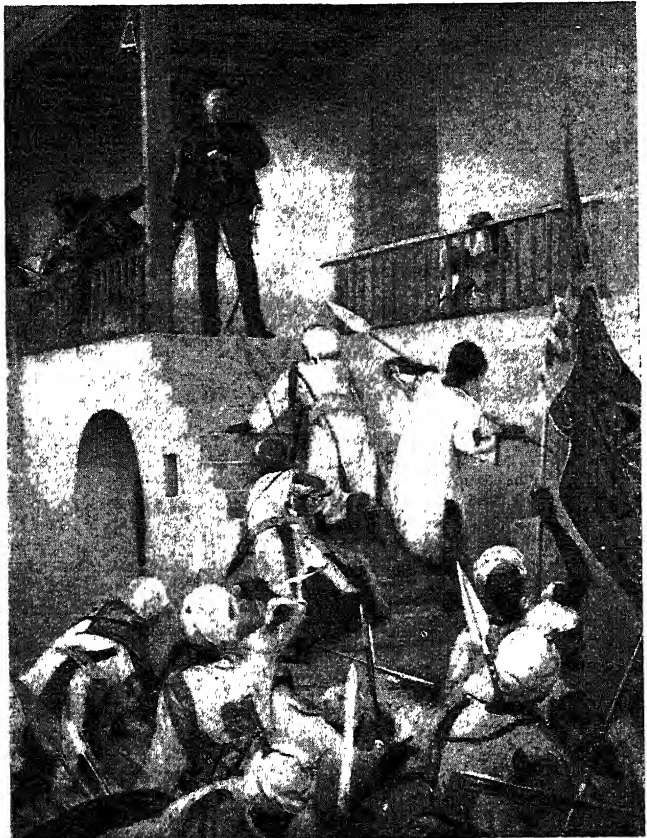
*C. G. Gordon*

breaker, livery-stable-keeper, and steeplechaser, and member of the House of Assembly.

In 1867 he published two volumes of poems, *Sea Spray* and *Smoke Drift*, and a dramatic lyric

*Ashtaroth*. *Bush Ballads* and *Galloping Rhymes* was published in 1870, and on June 24 of that year he shot himself at New Brighton, Melbourne, disappointment at failure to establish his claim to an estate in Scotland having aggravated a mental disturbance from which he had suffered throughout life. His collected poems epitomise the outlook of the Australian bushman. Gordon has a bust in Westminster Abbey. *Consult* Lives, E. Humphris, 1933; D. Sladen, 1934.

**Gordon, CHARLES GEORGE** (1833-85). British soldier. Born at Woolwich, Jan. 28, 1833, he entered the Royal Engineers in 1852, served in the Crimean War in 1855, and took part in the Chinese expedition of 1860. After the peace, Gordon was allowed to assist the Chinese government in the suppression of the Taiping rebellion (1863-64), when his achievements won him the popular sobriquet of "Chinese" Gordon. In 1873 his services were lent to the khedive of



Charles George Gordon. The capture and murder of the general by the Mahdi's forces at Khartum, Jan. 26, 1885. From the painting by Geo. W. Joy. By permission of Frost & Reed, Ltd., Art Publishers, Bristol & London, publishers of the etching



Egypt, Ismail, for the organization of the district known as the Egyptian Sudan. After a brief withdrawal, he returned thither in 1877 as governor, a position which he resigned in 1880.

Between 1880 and 1884 the Mahdi, a self-styled successor of the prophet, acquired a dangerous ascendancy over the fanatical Sudanese tribes. The Egyptian government was unable to re-establish its own authority, and the British government was not prepared to undertake the task of conquest. But the Egyptian garrisons at Suakin, Berber, Khartum, and elsewhere were not strong enough to maintain their positions unsupported, and the British government was induced to commission Gordon with the duty of withdrawing them, for which his unique knowledge of the Sudan and his immense personal influence marked him out. But when in 1884 he appeared on the scene, he at once formed the conclusion that it was the business of the Egyptian government to "smash the Mahdi" and recover the Sudan.

#### The Khartum Expedition

The result was that in March Gordon, without British troops, was shut up in Khartum, while the British government, believing that he could withdraw if he would, and feeling itself placed in a false position, resented demands for the dispatch of a relief expedition which it persisted in regarding as unnecessary. When the real need was realized it was still believed that the matter was not urgent, and months were wasted in the discussion of alternative routes before the expedition actually started in Oct. British troops advanced up the Nile; in Jan., 1885, the advance guard, after some sharp fighting, reached Metemmeh, 100 m. below Khartum, where it halted for four days and then made its dash to bring Gordon out—too late. When it arrived at Khartum on Jan. 28 it found that the Mahdi had rushed the defences two days before, and that Gordon was dead.

So fell a soldier of true heroic type, a medieval warrior saint, a puritan mystic in the midst of 19th century materialism; fearing nothing and doubting nothing; one who, left to himself, had repeatedly accomplished the apparently impossible chiefly through his extraordinary power of influencing others. In China he had led his troops to battle, himself armed with nothing but a cane. Sudanese and Arabs had fallen under the spell of his personality.

As an administrator dealing with uncivilized or half-civilized peoples, unhampered by the complex organization of political systems, he had been incomparable, though he was an intractable subordinate. When the public services had not demanded his time and energies, he had devoted them to the redemption of the waifs and strays of humanity. A national monument erected to his memory in Trafalgar Square in 1888 was removed in 1947, and re-erected 1953 on Victoria Embankment, Westminster; his family placed a cenotaph bearing a recumbent effigy of him in St. Paul's Cathedral, and an equestrian statue was raised in Khartum. Other memorials are at Chatham, Rochester Cathedral, and Westminster Abbey, and his character and work are fitly commemorated in the Gordon Boys' School (*q.v.*) for destitute lads.

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**Gordon, LORD GEORGE** (1751-93). Third son of the third duke of Gordon. Born in London, Dec.



*George Gordon.*

*From an old print*

26, 1751, he became a lieutenant in the navy, but resigned on being refused a ship. He entered Parliament in 1774 as member for Ludgershall, Wiltshire. In 1779 he was elected president of the Protestant association for the repeal of the Catholic Relief Act of 1778, and in 1780 marched from St. George's Fields to the house of commons at the head of an enormous mob to present a petition against the measure. (*See* Gordon Riots.)

Lord George was imprisoned in the Tower for eight months and tried for high treason, but was acquitted. In 1787, for libelling the British judiciary and Marie Antoinette, he was imprisoned in Newgate, where he spent the rest of his life, solacing himself with dinners, balls, and music, especially

the bagpipes. In his later years he was a zealous convert to the Jewish faith. He died in Newgate, "of a delirious fever," on Nov. 1, 1793.

**Gordon, GEORGE STUART** (1881-1942). British scholar. Educated at Glasgow university, and Oriel College, Oxford, he became university lecturer in English, 1907-13, when he was appointed professor of English language and literature at Leeds university. He returned to Oxford in 1922 as Merton professor of English literature (until 1928). President of Magdalen College, 1928-42, he was vice-chancellor of the University, 1938-41. One of the most distinguished scholars of his day, he was Clark lecturer at Cambridge, 1933. He was also chairman of the B.B.C. spoken English committee. His publications included Charles Lamb, 1921; Trojans in Britain, 1924; Three Oxford Ironies 1927; Modern Biography, 1933; posthumously, in July, 1942, a collection of his other writings appeared, entitled Anglo-American Literary Relations. He died March 12, 1942.

**Gordon, LUCIE DUFF** (1821-69). British author and translator. Born in Westminster, June 24,



*Lucie Duff Gordon*  
*After H. W. Phillips*

1821, the only child of John Austen the jurist, in 1840 she married Sir Alexander Cornwall Duff Gordon, Bart., and subsequently numbered among her friends Tennyson, Dickens, Thackeray, and Kinglake, her house in Queen Anne's Gate being famous as a centre of intellectual society. Later she lived in Egypt, dying at Cairo, July 14, 1869. Her chief works are Letters from Egypt, 1865, and trans. of Von Ranke's Ferdinand I, and Maximilian II of Austria, 1853.

**Gordon, PATRICK** (1635-99). Scottish soldier. He was born March 31, 1635, at Auchleuchries,



*Patrick Gordon,*  
*Scottish soldier*

in Aberdeenshire, the younger son of a poor laird. In 1651 he found his way to Poland, and for a few years fought for the Swedes, the Poles, and the

emperor, being always ready when taken prisoner to transfer his services to his last opponents. In 1661 he entered the service of Alexis, tsar of Russia.

On a visit to England in 1685 Gordon was requested by James II to settle permanently in England, but was unable to obtain permission to do so. Circumstances brought Gordon into contact with the young tsar, Peter the Great, who conceived a great affection for him. Gordon was responsible for defeating a conspiracy, as a result of which Peter was established more firmly on the throne; while in 1698 he crushed the formidable revolt of the Strelitzes or household troops. He died at Moscow, Nov. 29, 1699. Passages from Gordon's Diary were printed for the Spalding Club in 1859.

**Gordon Bennett Cup.** Name of various sporting trophies presented by the American newspaper proprietor, James Gordon Bennett (*q.v.*). The motor race for the Gordon Bennett Cup has not been held since 1905, nor did the aeroplane race continue; but the international balloon race, instituted in 1906 and held in Europe annually, was revived after the Second Great War in 1946. The Gordon Bennett Aeronautic Cup goes to the entrant who alights nearest his previously declared destination. A third trophy was offered after the first two had been won outright.

**Gordon Boys' School.** British institution under the patronage of King George VI for the training of boys. Founded in 1885 as the national memorial to General Gordon (*q.v.*), the school provides general education and vocational training for boys from 13 to 17. To qualify for admission a boy must on entry be under 15 years of age, of good character and physique, and in necessitous circumstances. Free admission is granted to boys whose parents or guardians are unable to pay anything. The school is non-denominational. Special facilities are available to boys wishing to enter the army; boys with musical gifts are trained for direct entry into army regimental bands. Suitable civil employment is found for others. The school is at West End, near Woking, Surrey.

**Gordon Highlanders.** Regiment of the British army. The regiment was raised in 1794 by the marquess of Huntly, afterwards fifth and last duke of Gordon, who was at that time a captain in the 3rd Foot Guards, now the Scots

Guards. Embodied as the 92nd Foot, the regiment was given the Gordon tartan with a distinguishing yellow stripe. The Gordons went to Holland in 1799 and gained their first battle honour at Egmont-op-Zee. The regiment served



Gordon Highlanders' badge

under Sir Ralph Abercrombie in Egypt, where they fought at Aboukir and at the siege of Alexandria; the Sphinx on their colours commemorates these victories.

The Gordons were with Sir John Moore at Corunna and served under Wellington in the Peninsula, gaining nine battle honours. Forming part of Wellington's army at Quatre Bras, they drove the French from their positions, and at Waterloo routed a column of French infantry, taking 2,000 prisoners. It was on that occasion that they made their famous charge hanging on to the Scots Greys' stirrups and shouting "Scotland for ever."

The Gordons served throughout the Indian Mutiny, and marched with Lord Roberts from Kabul to Kandahar. Four honours were gained in the Afghan campaign of 1878-1880. In 1881 the 92nd Foot was amalgamated with the 75th Foot, which had been raised by Colonel Robert Abercrombie in 1788. The 75th Foot had had a distinguished record of service in Holland and India, and became the 1st battalion when amalgamated with the 92nd as the Gordon Highlanders.

In 1882 the Gordon Highlanders went to Egypt, being the first British unit to cross the Egyptian trenches at Tel-el-Kebir. Following service on the Nile (1884-85), the Gordons participated in the Chitral campaign (*q.v.*) and helped to storm the Malakand Pass. It was during the Tirah expedition that piper Findlater of the Gordons won the V.C. for piping his regiment, despite serious wounds, in an attack on the Afridi stronghold at Dargai. The Gordons served all through the Boer War, and took part in the defence of Ladysmith and the battle of Paardeburg.

Twenty-one battalions of the Gordon Highlanders were raised for service in the First Great War, the regiment earning the following battle-honours: Mons, Le Cateau, Marne, 1914, '18, Loos, Somme, 1916, '18, Ancre, 1916, Arras, 1917, '18, Cambrai, 1917, '18, and Vittorio Veneto.

At the outbreak of the Second Great War the Gordons went to France, and fought in Belgium, in the retreat on Dunkirk, and in the desperate defence of St. Valéry-en-Caux, 1940. Reconstituted battalions of the Gordons fought in Africa with the 8th and 1st armies and took part in the Sicily landings. Battalions of the Gordons shared in the invasion of Normandy, 1944, fighting at Caen and in all the major engagements to the end of the fighting in Europe in May, 1945. Other battalions of the Gordons served with the 14th army in Burma. The regimental depot is at Aberdeen.

**Gordon Riots.** Disturbances which took place in London in June, 1780. In that year Sir George Savile introduced a bill to enable

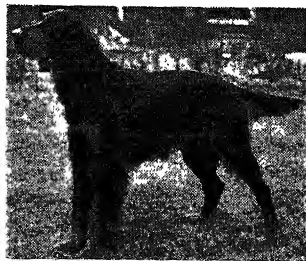


Gordon Riots. Troops of the Honourable Artillery Company firing on rioters looting a house in the City of London, June 7, 1780. A surgeon, Sir William Blizard, is seen tending wounded in the foreground  
From a picture by F. Wheatley

Roman Catholics who abjured the temporal sovereignty of the pope to purchase and inherit land; the bill also proposed to give a certain liberty to the priests. It became law as regards England, but a proposal to extend it to Scotland was violently opposed and was abandoned.

In England certain Protestants formed an association to work for the repeal of the act. Lord George Gordon (*q.v.*) took the lead, and at the head of about 60,000 people marched with a petition to Westminster on June 2. They forced peers and members of parliament to shout No Popery, and to wear blue cockades, made their way into the lobbies of the houses of parliament, and when the military arrived wrecked the chapels attached to the Bavarian and Sardinian embassies. On the 4th they renewed their attacks, and soon had a good part of London at their mercy. Prisons were broken open, numerous fires were started, and the Bank of England was attacked. On the 7th George III called a meeting of his ministers, and when they hesitated he himself ordered the military to act. The riots were suppressed, and the leaders brought to trial. Twenty-one were executed, but Gordon, who was tried for high treason, was acquitted. In Barnaby Rudge, Dickens gives a vivid picture of these riots.

**Gordon Setter.** Dog so called after a former duke of Richmond and Gordon who established the



Gordon Setter. Champion specimen

breed. A dignified animal, strong and muscular with deep head and intelligent expression, it has a coat that is soft and silky, straight or slightly waved but not curly, with feathered tail. Its colour is shiny black with tan or rich mahogany markings distributed symmetrically. Dogs should weigh about 65 lb., and measure about 26 ins. at the shoulder, bitches about 56 lb. and 24½ ins.

**Gordonstoun.** Public school for boys on the Moray Firth, Morayshire, Scotland. It was founded in 1934 by Kurt Hahn (b.

1886). In 1919 a school was started, with Hahn as headmaster, by Prince Max of Baden at his castle of Salem on Lake Constance, Germany; its object was to encourage in boys a sense of responsibility and initiative. Hahn was arrested in 1933 for publicly denouncing the Nazis, but was released soon after and came to Great Britain where he founded a school at Gordonstoun embodying the principles taught at Salem, and became a British citizen. The curriculum includes practical work, seamanship, mountaineering, and group and private projects. The school has accommodation for about 250 boarders, and there is an additional senior dept. for 120 boarders at Altyre House, near Forbes, 16 m. S.W. of Gordonstoun. Prince Philip, duke of Edinburgh, was one of the earliest pupils. *See also* Outward Bound Trust.

**Gore, CHARLES** (1853-1932). British prelate. Born Jan. 22, 1853, he was a nephew of the



Charles Gore, British prelate

4th earl of Arran. Educated at Harrow and Balliol College, Oxford, he was elected fellow of Trinity College, and was ordained. In 1880 he went to Cuddesdon as vice-principal of the college there, becoming in 1884 first head of Pusey House, Oxford, and an influential figure in Oxford, his main work being to permeate the High Church movement with the results of current Biblical criticism. In 1893 he became vicar of Radley; in 1894 he was made canon of Westminster, and in 1902 bishop of Worcester, where he worked hard to found the new diocese of Birmingham, of which in 1905 he became the first bishop. In 1911 he was translated to Oxford, resigning in 1919.

Gore founded the Community of the Resurrection at Mirfield; and wrote numerous theological and expository works that earned him a high reputation as a theologian. An able preacher, he was also distinguished for his active sympathy with socialistic and humanitarian ideas and movements. He died Jan. 17, 1932. *Consult* Lives by his nephew, John Gore, 1932; G. L. Prestige, 1938.

**Gorée.** Small island off Dakar, Senegal. It has a fortified harbour and exports wax, gold-dust, and ivory. Pop. (est.) 1,000.

**Gorgas, WILLIAM CRAWFORD** (1854-1920). American surgeon. Born Oct. 3, 1854, he studied medicine, and in 1880 was appointed an army surgeon. Rising to the rank of major-surgeon in 1898, he was sent as chief medical officer to Havana. In 1901 Walter Reed (1851-1902) and Gorgas stamped out the yellow fever in Cuba; and as chief sanitary officer for the Panama Canal, 1904-13, Gorgas saved thousands of lives in the unhealthy Canal district. In recognition of this he was promoted surgeon-general 1914. On the entry of the U.S.A. into the First Great War he organized the army medical service, and visited France in 1918. He died in London, July 4, 1920.

**Görgei** or **GORGEY, ARTHUR** (1818-1916). Hungarian soldier. Born at Toporez, Jan. 30, 1818, he came into prominence in the Hungarian rising against the Austrians in 1848. He achieved some signal successes, notably at Ozora, Oct. 7, where he forced the capitulation of 10,000 Croats, but found himself unable to work with Dembinski, the c.-in.-c., and was in fact accused of losing the battle of Kápolna by arriving late.



Arthur Görgei, Hungarian soldier

Subsequently Görgei himself was given the chief command, and almost cleared Hungary of the Austrians. But fatal delays were caused by his dissensions with Kossuth, the dictator. A Russian army came to the help of the Austrians, and Görgei was compelled to surrender near Világos on Aug. 13, 1849. For this he was accused of treachery, a charge of which he was cleared in 1885. He died May 21, 1916.

**Gorges, SIR FERDINANDO** (c. 1566-1647). British adventurer. Born in Somerset, he became a soldier. He fought against the Spanish armada and in France for Henry IV; went on an expedition with Essex, with whose rebellion he was associated, and served in Ireland. In 1596, having been knighted, Gorges was made governor of Plymouth, and there he shared in the early plans for settling colonists in America. A member of the Plymouth Company, he frequently sent out ships and colonists to the New World, in which he had obtained grants of land. The most considerable of

these was one of 1639, making him lord of Maine, of which state he is regarded as the founder. In 1647, too old to serve the king in the Civil War, he died at Long Ashton, Somerset. *Pron.* Gor-jez.

**Gorget** (Fr. *gorge*, throat). In armour, a metal covering for the throat, protecting the gap between the breastplate and helmet. In the ornate armour of the 16th century the gorget was often richly embossed. Reduced to a crescent-shaped ornament, it was long worn by officers to denote that they were on duty. The name is now applied to the patches or tabs worn on the collar by officers of the British army above the rank of lieutenant-colonel. These are relics of the hooks from which the original gorget was suspended. *See* Armour. *Pron.* Gor-jet.



Gorget: armour to protect the throat

**Gorgias** (c. 475-390 B.C.). A Greek philosopher and sophist. Born at Leontini, in Sicily, he came to Athens in 427 to plead the cause of his native town against Syracuse. Primarily a teacher of rhetoric, in which he introduced a number of innovations, unfamiliar words, and rhetorical figures, he also wrote a treatise *On Nature*, which is entirely lost. In this he maintained that nothing really existed; that if it did exist it could not be known; and that even if it could be known it could not be communicated. Gorgias is one of the chief interlocutors in the *Dialogue* of Plato which bears his name. The authenticity of two extant speeches—*An Apology for Palamedes* and *An Encomium of Helen*—attributed to him is disputed. *See* Sophists.

**Gorgons**. In Greek mythology, three monsters named Stheno, Euryale, and Medusa, who dwelt in Libya. Instead of hair, their heads were covered with crawling serpents, and they had the property of turning into stone anyone who looked upon them. Medusa, who alone was mortal, was killed by Perseus, who struck off her head, looking at her reflection in a mirror while he did so, in order to avoid being turned into stone. Perseus presented the head to Athena, who set it in the middle of her shield. Similarly, the Chinese and other Oriental nations decorated their shields with frightful figures, to terrify the



Gorgons. Head of Medusa, alto-relief. Roman copy of a Greek original of the end of the 5th cent. B.C. Glyptothek, Munich

enemy. Later, the Gorgons were represented in art as beautiful maidens. Probably personifications of the flashing lightning, the rationalists explained them as a race of hideous women. Their sisters, the Graecae, personifying old age, had the forms of swans and only one eye and one tooth between them. *See* Perseus; Repoussé illus.

**Gorgonzola**. Town of Italy, in the prov. of Milan. It is 12 m. N.E. of Milan, with which it is connected by a steam tramway. It is engaged in the silk industry, but is best known for the cheese which takes its name from the town. Pop. (1951) 7,453.

Gorgonzola cheese is a member of the blue vein family, and is made by putting alternate layers of warm and cold curd into a surrounding thickness of warm curd. It matures in four or five months, but is usually kept for ten or twelve weeks longer to improve it. The cheeses are round and flat, and weigh about 16 lb.

**Gorhambury**. Hertfordshire seat of the earl of Verulam. It is 2 m. W. of St. Albans. The mansion, standing in a fine park, was built 1778-85, includes much later work, and is notable for its hall and pictures. In the ground are ruins of the house in which Francis Bacon lived in almost regal state. The manor originally belonged to



Gorhambury, Herts. Ruins of the house built in 1568, later occupied by Francis Bacon

the abbey of St. Albans, was granted by Henry VIII to Ralph Rowley and then to John Maynard. It was bought in 1550 by Nicholas Bacon and descended to his nephew Sir Thomas Meautys, whose widow married Sir Harbottle Grimston, Speaker of the Restoration parliament.

**Gori**. Town of Georgia S.S.R. It stands on the river Kura and the Poti-Tbilisi rly., 48 m. N.W. of Tbilisi. The chief manufactures include cotton and woollen goods. It is also a timber, vine, and cattle centre, and has fruit-canning factories. At Gori, formerly the residence of the princes of Karthli (Georgia), Stalin was born; his birthplace, a cottage, was enclosed in a marble temple. Pop. 10,000.

**Gorilla**. Largest of the anthropoid or manlike apes. It is found only in Western Equatorial Africa, where it inhabits the forests. A



Gorilla. The man-like ape of the African forests

fine male may attain a height of slightly over 6 ft., the female is rather shorter.

The gorilla is distinguished from the chimpanzee (*g.v.*) by its greater size, larger teeth, heavy brow ridges over the eyes, and great length of the arms—the hands reaching well below the knees when the animal stands erect. The adult animal has also a more savage look. In bulk and in length of limbs the full-grown gorilla much exceeds an average man. The colour is black, though some specimens show a slightly reddish tinge on the head and shoulders, and the body is covered with coarse hair.

The hands are wider and stouter than those of the chimpanzee, and the fingers are partly united by a strong web of skin, while the

thumb is short and not very useful as an opposable member. In contrast, the great toe is remarkably developed, and the foot is a powerful grasping instrument. Owing to the shyness and wariness of the gorilla, and its habitat in the densest forests, little is known as yet of its mode of life. The animals appear to have some kind of family life, the male and female being found with young ones of various ages, but it is doubtful whether they have any permanent home.

So far as is known, the gorilla in its wild state lives on fruit and roots, possibly varying its diet with eggs and young birds, and it has sometimes proved troublesome by robbing plantations.

The gorilla, like the chimpanzee and the orang-utan, does not habitually walk erect, but supports itself with its hands, which are usually partly closed so that the weight is borne on the knuckles. In the trees these animals move with surprising speed and agility, and can take long leaps that would appear impossible for such heavily built animals. Owing to its great muscular development and savage disposition, it is a very formidable opponent when brought to bay, but the stories of aggression on its part appear to be ill-founded. It rather avoids encounter with man, and makes off with great speed on his approach.

It is difficult to keep the gorilla in captivity. Young specimens exhibit some docility for a time, but soon mope and die. Adults can be tamed but unless expertly managed quickly die. Several gorillas have been kept in the London Zoological Gardens.

**Gorinchem** or **GORKUM**. Town of the Netherlands, in the prov. of S. Holland. It stands on the Merwede at the Linge inflow, 22 m. E.S.E. of Rotterdam. The town is picturesque, with 17th century gateways and brick and stone houses decorated with mosaic work. It has an excellent harbour, and carries on a trade in cattle, cereals, and hemp, while its salmon fisheries are important.

The Merwede canal communicates with Amsterdam. A few miles below Gorinchem begins the Biesbosch, a district 40 m. in area, which was overwhelmed by a flood in 1421, when over 70 market towns and villages were wiped out, with death-roll exceeding 100,000. The district has since been reclaimed. Gorinchem was the first city taken by the Water Geuzen (Beggars) from the Spaniards in 1572. Pop. 13,985.

**Goring**. Village and parish of Oxfordshire, England. It is on the Thames, opposite Streatley, on the Berkshire side of the river, 9 m. N.W. of Reading. Forthetwoplaces there is a W. region rly. station. It is a boating centre, being also visited by anglers. There is a church with a Norman tower and formerly there was a nunnery here. It lies amid beautiful scenery and gives

its name to the gap between the Chilterns and the Marlborough Downs through which the Thames flows. Here the Icknield Way crossed the river. Near by is the village of Goring Heath. Pop. (1951), parish, 2,172.

**Goring-by-Sea**, in Sussex, England, is a coastal resort and residential area 2½ m. W. of Worthing, of which bor. it forms part. Richard Jefferies died here in 1887.

**Goring, GEORGE GORING, BARON** (1608-57). English royalist. Elder son of George Goring, earl of Norwich (?1583-1663), he was born July 14, 1608. As a soldier, he gained experience in the Dutch service before being made governor of Portsmouth in 1639. He served Charles I in the

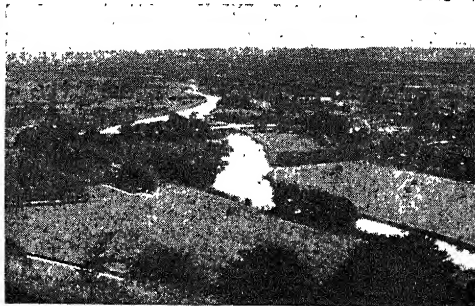


Lord Goring,  
English royalist  
After Van Dyck

short wars against the Scots and was one of those who suggested to the king the idea of using the army to overawe the parliament. This army plot was betrayed by him, but when war began he was found on the side of the king.

Having surrendered Portsmouth he went to the Netherlands to raise soldiers, and then had a command in Yorkshire. He was taken prisoner at Wakefield, but was again free when Marston Moor was fought, and there commanded a wing. After this Goring held a command in the W. of England, where the plundering by his troops made him hated. He shared in the campaign that culminated in the defeat at Naseby, and was himself crushed at Langport in July, 1645. He passed the rest of his days in France and Spain. He died in Madrid.

**Göring**. Alternative spelling of the name of Hitler's associate, Hermann Wilhelm Goering (q.v.).



Goring, Oxfordshire. The Thames, with the village beyond, from Streatley

**Gorizia**. Town of Italy, capital of the prov. of the same name. Formerly a town of Austria, Gorizia was ceded to Italy in 1919. Gorizia is on the east bank of the Isonzo, 23 miles N.N.W. of Trieste, and is dominated by a hill surmounted by the ancient castle of the counts of Görz. The old part of the town is enclosed by triple walls. Noteworthy buildings are the 17th century cathedral, the municipal offices, the archbishop's palace, the Jesuit college, and the house of the provincial diet. The principal industries are cotton and silk weaving, and the manufacture of leather articles, liqueurs, pottery, paper, soap, and candles. There is also a considerable trade in fruit and wine. Pop. (1951) town, 43,974; prov., 137,535.

Gorizia was one of the strategic positions demanded from Austria by Italy in April, 1915, as the price of her continued neutrality in the First Great War and as



Gorizia, Italy. The old fortress of the counts of Görz on the Castle Hill overlooking the town

compensation for the Austrian advantages gained in the attack on Serbia. Following their declaration of war on the Central Powers, the Italians opened an offensive on the Isonzo in July, 1915, but made little headway towards the town. General Cadorna launched a general attack along the Trentino front, and on Aug. 4 delivered a furious assault along an eight-mile line opposite Gorizia. The Austrian defences collapsed under an intensive artillery bombardment and the Italian infantry carried the heights on the W. bank of the Isonzo overlooking Gorizia. The following day the Italians stormed Monte San Michele, the key to the Gorizia positions, and after two days' fighting occupied Gorizia itself, holding it until Oct. 28, 1917, when they lost it to the Austrians as a result of their defeat at Caporetto (*q.v.*). The Italians reoccupied it in 1918. The New Zealand 2nd div. entered Gorizia on May 2, 1945. The peace treaty of 1947 gave Yugoslavia all but 183 sq. m. of the prov. of Gorizia constituted in 1927; what remained, including the capital, was reconstituted a new prov. of Gorizia.

**Gorkum.** See Gorinchem.

**Gorky.** Region and town of the R.S.F.S.R., in the Volga basin. The chief rivers of the region, area 29,100 sq. m., are the Volga and its tributary the Oka. Forest covers about two-thirds of the region, and lumbering is an important industry. Flax, potatoes, wheat, and hemp are grown; there is some dairy farming, and pigs and poultry are reared. Deposits of iron ore and peat are worked. Steel and metal products are made; and there are shipbuilding yards. Hydro-electricity is being developed. Pop. (est.) 3,600,000.

The town of Gorky, capital of the region, stands at the confluence of the Volga and the Oka, 250 m. E.N.E. of Moscow; until 1932 it was called Nijni Novgorod. The town is divided into three parts: the upper town on three hills, surmounted by a citadel, with the chief administrative and military buildings; the lower town, on the right bank of the Volga; and the Kunavino suburb, between the Oka and Volga, site from 1817 of the great annual fair (July 25 to Sept. 10) of Nijni Novgorod at which the products of the country for hundreds of miles around were sold and exchanged. The town was founded in 1221 by Yuri, prince of Suzdal-Vladimir, and after the downfall of the Kazan Tartars, in

1552, became the chief centre of exchange for Russian and Asiatic goods. Birthplace of Maxim Gorky (*v.i.*), it was given the name of Gorky in his honour by the Soviet government.

The town has a university. There is trade in cereals, metals, and fish; and for some years before the Second Great War, and still more during the war itself, Gorky was developed by the Soviet government as a centre of heavy industry, turning out motor cars, tanks, aeroplanes, locomotives, etc. Pop. (est.) 900,000.

**Gorky, MAXIM** (1869–1936). A Russian author. He was born at Nijni Novgorod (renamed Gorky, *v.s.*, in his honour), March 14, 1869, his real name being Alexei Maximovitch Pyeshkov. His father died when he was four years of age, and his mother shortly after re-married. The boy was brought up by his maternal grandfather, but after a few months' schooling was apprenticed to a cobbler, and two months later to a draughtsman, from whom he ran away; then, after being assistant to an ironmaker, he became help to the cook on a Volga steamer, who inspired him with a liking for reading.

At the age of 16 Gorky, failing to secure education at Kazan university, entered a biscuit factory, afterwards working at anything that offered. In 1888 he tried to commit suicide, and on recovery resumed that vagabond life which later provided him with almost inexhaustible material for his pen. In 1892 his first story, *Makar Chudra*, appeared in a Tiflis journal. In 1893 V. G. Korolenko encouraged him to write. He rapidly produced *Chelkash*, 1893, and other short stories, becoming immediately popular. His stories began to appear in book form in 1898, many volumes of them later being translated into English. *Foma Gordeyev*, 1900 (Eng. trans. 1901), his first novel, though marked by fine descriptions of scenery of the Volga, and by remarkable character drawing, was on the whole disappointing. His play, *The Lower Depths*, was produced in London in 1903.

He was imprisoned in 1905 in connexion with the strikes of that year. After a visit to the U.S.A.

(1906), he settled in Capri, returning to Russia in 1914. On the outbreak of the First Great War he volunteered for service with the Russian Red Cross, and after the revolution became president of a committee for safeguarding artistic property. In 1922 his health compelled him to go abroad. He went first to Germany and then to Sorrento. He was given an enthusiastic reception when he visited Russia in 1928, and returned in 1932 to live there until his death, June 18, 1936.

His later works include *Fragments* from my Diary, 1924; *The Artamonoff Family*, 1926; *The Magnet*, 1931; *On Guard for the Soviet Union*, 1933. Consult Maxim Gorky, His Life and Writings, E. J. Dillon, 1902; Maxim Gorky and his Russia, Alex. Kaun, 1932.

**Gorleston-on-Sea.** Parish and watering place of Norfolk, England. It is part of the borough of Great Yarmouth, 122 m. N.E. of London, and is reached by rly. (E. region). Standing at the mouth of the Yare, it has good sands, in addition to a pier, swimming pool, golf course, and other attractions for visitors. Bus, river steamer, and train services connect it with Yarmouth proper. Pop. (1951) parish, 24,984.

**Görlitz** (Pol. *Zgorzelec*). Town of Silesia near the Saxon border, mainly on the left bank of the Lausitzer Neisse. For seven centuries, Görlitz, seat of an old scientific society, and of the triennial Silesian music festivals, was a political and strategic as well as economic outpost of importance, a centre of spinning and weaving, and in later times of rolling stock, engineering, timber, and glass industries. It received the privileges of a German city in A.D. 1220 and, in 1378, became capital of a duchy of the same name, granted by Emperor Charles IV to his son John; it defeated the Hussites in 1429 but lost most of its powers and wealth in 1547 in a struggle against Ferdinand I. It fell to Saxony in 1635, to Prussia in 1815. Many remarkable buildings witnessed to its proud history: watchtowers of the 15th century, such as the "Kaisertrutz," the *Frauenturm*, etc.; S. Peter and Paul (1423–57), the Trinity (13th century), and other churches; the chapel of the Cross (1465–98) with a copy of the holy sepulchre; the Gothic town hall (1534) etc. A theatre, a museum of natural history, a statue and tomb of the mystic Jacob Boehme, and a



Maxim Gorky,  
Russian author



viaduct across the Neisse, 1,580 ft. long and 600 ft. high, a park and vineyards were among the attractions of Görlitz. In 1945 the western part came within the Russian zone of Germany; the eastern part was placed under Polish administration, but was returned to E. Germany in 1955. Pop. (est.) 90,000.

**Gorlovka.** Industrial town of Ukraine S.S.R. It lies 35 m. N.N.E. of Stalino, and was one of 14 new towns constructed in the 1930s in Donetz basin. It is a coalmining centre, and also has chemical and metallurgical works; there are mercury mines to the north. Pop. (est.) 110,000.

**Gornergrat.** Rocky ridge of the Pennine Alps, Switzerland, in the canton of Valais. It forms part of the Riffelberg, 3½ m. S.E. of Zermatt, with which it is connected by a mountain rly. Alt. 10,289 ft. The summit commands a panorama of the Monte Rosa-Breithorn-Matterhorn group. At its base lies the Gorner Glacier.

**Gorno-Altai** (mountainous Altai). Autonomous region of Altai territory, R.S.F.S.R., in the Altai Mts. About half its inhabitants are Russians; the rest are Altaic tribes—Oyrots, Timuk, Telengel, and others. The capital Gorno-Altaiisk (formerly called Ulala and, 1932-48, Oyrot Tura) lies in the N. on the Katun r., in the only part of the region suitable for agriculture; elsewhere lumbering and fur trapping are carried on. Manganese, gold, and mercury are mined. Area 35,800 sq. m.; pop. (est.) 150,000.

**Gorno-Badakhshan.** Autonomous region of Tadzhik S.S.R. Formed in 1925, it lies on the Pamir plateau and borders China on the E., Afghanistan on the S. Salt, limestone, gold, and peat deposits are worked; beans and grain are grown in the W. The capital Khorog, on the Panja r. which forms the boundary with Afghanistan, is connected by road and air with Stalinabad. Area 23,600 sq. m.; pop. (est.) 45,000.

**Gorse.** See Furze.

**Gorsedd** (Welsh, assembly). Open-air bardic ceremony, part of the Eisteddfod (*q.v.*).

**Gorst, Sir John Eldon** (1835-1916). British politician. Born at Preston, May 24, 1835, and educated at the grammar school and St. John's College, Cambridge, he went in 1859 to New Zealand, where he became civil commissioner in Wai-kato. Returning to England, he was called to the bar in 1865. He entered the house of commons in



*John Eldon  
Russell*

Gorst was knighted in 1885, was solicitor-general in 1885-86, under-secretary for India from 1886-91, financial secretary to the treasury, 1891-92, and vice-president of the committee of the council on education from 1895 to 1902. He took a keen interest in labour and social questions, and in 1890 was British plenipotentiary at the labour conference in Berlin. He died in London, April 4, 1916. His elder son, Sir Eldon Gorst (d. 1911), succeeded Lord Cromer in 1907 as British consul-general in Egypt.

**Gort, Sir John Standish Surtees Prendergast Vereker, Viscount** (1886-1946). British

soldier. Born on July 10, 1886, he succeeded his father the 5th Viscount Gort, of Limerick, in 1902. He was created Viscount Gort, of Hamsterley, in the peerage of the U.K., in 1945. Educated at Harrow and Sandhurst, he was commissioned in the Grenadier Guards, 1905, and at the outbreak of the First Great War was a captain. He had a distinguished career in France, gaining the M.C., 1915, the D.S.O. with two bars, 1917. In Sept., 1918, while in command of a battalion of the Grenadier Guards, he won the V.C. by leading a platoon to success in an assault upon machine gun and artillery positions holding up the crossing of the Canal du Nord at Flesquières; he was wounded three times.

After the war Gort became an instructor at Camberley and at Sheerness; and director of military training in India, 1932. Promoted major-general, 1935, he was appointed commandant of the staff college, Camberley, 1936; military secretary at the war office, 1937, and three months later C.I.G.S. with the rank of full general. Gort immediately inaugurated a comprehensive pro-

gramme for modernising the equipment and training of the British army in the light of technical developments. War broke out before his plans were completed, and he went to France on Sept. 14, 1939, as c.-in-c., B.E.F. (Gen. Ironside replacing him as C.I.G.S.). His forces consisted of four British divisions and the French 51st division. The British divisions were short of armour, ammunition, artillery, equipment, and signals, and had scarcely any air support. During the winter and spring of 1939-40 Gort arranged with the French command for infantry brigades of the B.E.F. successively to complete short tours of duty on the Saar front to give them experience of actual contact with the enemy. The German offensive of May, 1940, and the three weeks' campaign which followed are described under British Expeditionary Force. Gort's dispatches, publ. Oct. 1941, shed much light on that campaign.

Gort returned to England on June 1, 1940, and in July was appointed inspector-general to the forces in training and inspector-general Home Guard. In 1941 he became governor and c.-in-c., Gibraltar, doing much to strengthen the defences of the "Rock." He was governor and c.-in-c., Malta, 1942-44, giving outstanding leadership there when supplies were dangerously low owing to prolonged siege of the island from the air. Field marshal in 1943, he went to Palestine in Oct., 1944, as high commissioner for Palestine and Transjordan, and c.-in-c., Palestine. His health broke down, and he resigned Nov., 1945. He died in London on March 31, 1946. His U.K. peerage died with him; his brother, Robert Standish Gage Prendergast Vereker (b. 1888), succeeded to his Irish titles.

**Gortchakov, Prince Alexander Mikhailovitch** (1798-1883). Russian diplomatist. Born July 16, 1798, he entered the diplomatic service and became secretary at the embassy in London in 1824. After holding various posts he was appointed ambassador to the German Bundestag in 1850. Thence he was transferred to Vienna, 1854-56, in the latter year succeeding Nesselrode as foreign minister to



*Viscount Gort, V.C.  
British soldier*



*Gortchakov*

was transferred to Vienna, 1854-56, in the latter year succeeding Nesselrode as foreign minister to

Alexander II, and in 1863 became chancellor of the empire. His policy was at first strongly pro-Prussian, but later he began to distrust Bismarck, a feeling increased by Germany's attitude of aloofness from Russia in the Turkish war of 1877-78. He then turned his attentions to France and worked for a Franco-Russian *rapprochement*. He resigned his portfolio as foreign minister in 1882, and died at Baden-Baden on March 11, 1883. See Berlin, Congress of.

**Gortchakov, MIKHAIL DMITRIVICH** (1795-1861). A Russian soldier. Of noble family, he became a soldier and saw service



M. D. Gortchakov,  
Russian soldier

against the French in 1812-14. He fought against the Turks in 1828-29, against the Poles in 1831, and against the Hungarians in 1849. In 1846

he was made governor of Warsaw, and when the Crimean War began his reputation was sufficiently high for him to hold an independent command. His first operations were against the Turks in Moldavia and Wallachia, and an unsuccessful attack on the fortress of Silistria, but later he was entrusted with the command in the Crimea. There he won fame by his defence of Sevastopol. In 1856 he was made governor-general of Poland, and died at Warsaw, May 30, 1861.

**Gorton.** District of Manchester. It is an industrial area on the E. side of the city. It is served by railway, buses, and trolley-buses, and includes four eccles. districts. The chief industries are chemical works, engineering works, iron-works, and cotton mills. Gorton gives its name to a borough constituency of Manchester.

**Gortonites.** A religious sect founded in the U.S.A. about 1650 by Samuel Gorton (c. 1610-77). A native of Gorton, Lancashire, he fled to America on account of his religious opinions. At Warwick, Rhode Island, he made a settlement, mainly of those who shared his religious opinions. Named after him, the Gortonites, who disliked all forms and ceremonies, existed until about 1800.

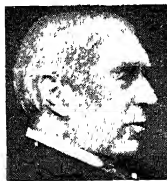
**Gortyna** OR GORTYN. Ancient city of Crete, situated on the S. side of the island about 10 m. inland. It was second only to Cnossus (*q.v.*) in importance, and

the two cities from an early period were constantly at variance. In Roman times it became the capital of the island. An inscription found near Gortyna in 1884 contained laws dated about 400 B.C.

**Gorz.** German for Gorizia (*q.v.*).  
**Gosau Beds.** Series of limestones, marls, and sandstones in the north-eastern Alps of Austria. A local development of the Upper Cretaceous system, they contain fossil shells and banks of corals.

**Goschen, GEORGE JOACHIM GOSCHEN, 1ST VISCOUNT** (1831-1907). British statesman. Born August 10, 1831, he was of German descent, his grandfather being a publisher of Leipzig. His own birth and education, however, were English, and after a fine career at Rugby and Oriel College, Oxford, he became a partner in the London firm of Fröhling and Goschen. In 1863 he entered parliament as Liberal member for the City of London, and in 1865 joined the ministry, entering Russell's cabinet the next year. From 1868-71 he was president of the poor law board, and from 1871-74 first lord of the admiralty under Gladstone. Declining to take office in 1880, he was sent as special ambassador to Turkey.

As a Liberal Unionist after 1884 Goschen was in more congenial company. He denounced Home



Goschen  
Elliott & Fry

Rule with great spirit, and alone of his party took office under Salisbury in 1886. This was the occasion on which Lord Randolph Churchill, confident that his resignation would

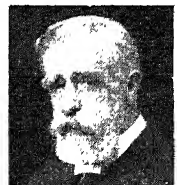
seriously embarrass the premier, "forgot Goschen," who remained chancellor of the exchequer until 1892. From 1895 to 1900 he was again first lord of the admiralty. He was M.P. for St. George's, Hanover Square, where he had found a seat when Liverpool rejected him in 1887. Previously he had represented Edinburgh, and earlier still Ripon. In 1900 he retired and was made a viscount. He was, however, active in his hostility to tariff reform, and spoke occasionally in the Lords until his death, Feb. 7, 1907.

Goschen was a man of many interests and sturdily independent. He wrote a standard book on the Foreign Exchanges, and in later

life edited the *Life and Times* of his grandfather. Short sight prevented him from being chosen Speaker, 1884. From 1903 to 1907 he was chancellor of Oxford University. *Consul* Life, Hon. A. Elliot, 1911; Lord Goschen and his Friends, ed. Percy Colson, 1946.

His son, George Joachim (1866-1952), 2nd viscount, was member for East Grinstead, 1895-1906, and was joint parliamentary secretary to the board of agriculture in 1918. He served as governor of Madras, 1924-29, and was acting viceroy and governor-general of India, June-Nov., 1929.

**Goschen, SIR WILLIAM EDWARD** (1847-1924). British diplomatist. A son of W. H. Goschen, a London banker, and a younger brother of the 1st Viscount Goschen, he was born July 18, 1847. Educated at Rugby and Oxford, he entered the diplomatic service, and



Sir William Goschen,  
British diplomatist  
Russell

after passing some time as attaché at Madrid, Buenos Aires, and Paris, became secretary at Rio de Janeiro. From there he went to Constantinople, after which he acted as principal secretary at Peking, Copenhagen, Lisbon, Washington, and St. Petersburg. In 1898 he was British minister to Belgrade.

From 1900 to 1905 he was minister at Copenhagen, and from 1905 to 1908 was ambassador at Vienna. In 1908 Goschen was transferred to Berlin, and it was his lot to conduct the negotiations immediately preceding the outbreak of the Great War and to leave the German capital on its declaration. In 1901 he was knighted, in 1905 was made a privy councillor, and in 1916 a baronet. He died May 20, 1924.

**Gosforth.** Urban district and residential town of Northumberland, England. It is 2 m. N. of Newcastle-upon-Tyne, and has a rly. station. Near by is Gosforth Park, where race meetings are held, and there are three golf courses. Pop. (1951) 24,483.

Another Gosforth is a village in Cumberland, on the edge of the Lake district, 12 m. S.E. of Whitehaven. It is noted for its ancient Viking cross, a structure in the churchyard. 14½ ft. high.

**Goshawk** (*Accipiter gentilis*). Bird of prey, resembling a large sparrowhawk. It is found in many



Goshawk, a large bird of prey, formerly used for hawking

parts of Europe and Asia, but is now very rare in Great Britain. The species was formerly fairly common and was used in the sport of hawking. The plumage is brown on the back, and white barred with brown beneath.

**Goshen, LAND OF.** District given by Pharaoh to the children of Israel for a dwelling-place (Gen. 47, v. 27). The name is not found in records and its location is uncertain; it was probably in the E. Delta, and may have been the Wadi el Tumilat, between Ismailia and Zagazig.

**Goslar.** Town of W. Germany, in the *Land of Lower Saxony*. Lying under the Harz Mts., it is in the form of an ellipse, embraced by the Rammelsberg (2,100 ft.) and the Steinberg (1,370 ft.). The town is still surrounded by its old fortifications with watch-towers constructed in the 15th and 16th centuries. The Dome Chapel (1050), the Market Church (12th century), S. James's and the Frankenberg church (both 11th century), the former Augustine monastery Grauhof, the Kaiserhaus, founded in the 10th century, completed in the 11th by Henry III, the Gothic town hall (15th-16th century) and a guild hall (1494), a hospital of the 13th century, and many public and private buildings of the middle ages, make Goslar highly picturesque. Founded in

920 by Henry I, Goslar became wealthy from silver, copper, and lead mining in the Harz, was the seat of many Imperial parliaments, and, from 1281, was also a member of the Hanseatic League, a free city from 1400; ruined by the Thirty Years' War, it lost its independence in 1801, became Prussian 1802, Hanoverian 1815, and again Prussian in 1866. It has chemical, cigar, wood, stone, paper, and other industries, and had (pre-war) 20,854 inhabitants.

**Gospel.** An Anglo-Saxon compound word, god-spel, meaning good news, used as an equivalent of the Greek *euangelion*. The word is now used in various senses. It is the name of the biographies of Christ in the N.T.; signifies the message of redemption contained in those books; and is further used as a term for the entire Christian system of religion. Thus in the N.T., "to believe the Gospel" means not merely to accept the record of Christ as true, but to accept all that that record implies. See Bible; Gospels, The Four; New Testament.

**Gospellers.** A name formerly applied to the followers of Wycliffe and other pioneers of the Reformation in England, who laid stress on preaching the Gospel to the people. It was also given to a party of Antinomians who caused trouble during the Reformation period, and at a later date to the Puritans. In Church ritual, the gospeller is the deacon who reads the Gospel in the Mass.

**Gospel Oak.** Name of a short thoroughfare, or Grove, connecting Rochford Street and Haverstock Road, London, N.W. It is also the name of a rly. station, 6½ m. from Broad Street, lying between Kentish Town and Hampstead Heath. From an old oak tree at the boundary of Hampstead and St. Pancras parishes, at which a portion of the Gospel was read at the beating of the bounds, an

inn was named; and the name was later given to the surrounding fields, now built over, to a small village, to a chapel, to a school, and to the railway station.

Under one of the trees in Gospel Oak Fields, Whitefield is said to have preached; and here, down to 1857, was held a fair known as Gospel Oak Fair.

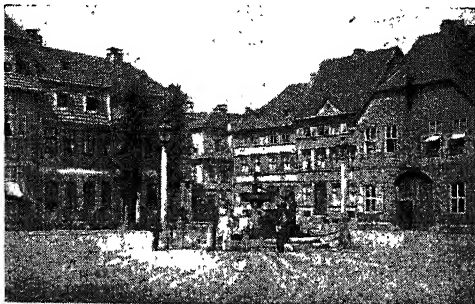
**Gospels, THE FOUR.** The name given to the first four books in the N.T., which are ascribed to Matthew, Mark, Luke, and John. The first three stand together and form a striking contrast to the fourth. They are called "the Synoptics," because they follow the same lines and deal with the narrative from a similar point of view. Mark is the earliest of the three and gives the story of the life of Jesus in its simplest form. Matthew adapts his narrative for Jewish readers, and his apologetic aim is manifest in his constant use of the argument from prophecy. Luke, on the other hand, being a Greek, strives to make his portrait of Jesus appeal to the Greek-speaking world.

The fourth Gospel was written thirty years later than the others, and is obviously an interpretation of Christ rather than a record of events. Its purpose is definitely stated in the words, "These (signs) are written that ye may believe that Jesus is the Christ and that believing ye may have life in His name" (20, v. 31).

The problem of the inter-relation of the Synoptic Gospels has been very widely discussed. It is no longer possible to regard them as independent writings. The immense amount of common material, the similar arrangement of events, the many verbal similarities put such a theory out of court.

It is inconceivable, for instance, that three independent writers in the narrative of the healing of the palsied man of Capernaum could have introduced at the same point in the story exactly the same parenthesis ("he saith to the sick of the palsy"). The hypothesis that the three evangelists embodied and reproduced the oral tradition of the Church has come to be regarded as inadequate. The most generally accepted theory is that the similarities in the three narratives can be accounted for only by assuming that the evangelists derived their materials from common sources. One of these sources is generally identified with the Gospel of Mark, perhaps not in its present form.

The justification for this assumption is ample. Practically the



Goslar, Germany. Market place with the fountain dating from about the 12th century

whole of Mark is embodied in Matthew and Luke, and even the order of Mark's narrative is followed by one or other of the later evangelists. It is only very rarely that Matthew and Luke agree in differing from the statements or arrangement, or phraseology of Mark. In addition to Mark it is known that the other two evangelists used another document, because their gospels contain much common material which is not derived from that source. This material is chiefly connected with the teaching of Jesus. It is, therefore, highly probably that the second documentary source employed by Matthew and Luke, was a collection of the Logia or Sayings of Jesus; and attempts have been made, notably by Harnack, to reconstruct it. Such a reconstruction, however, is bound to be hypothetical, since when Matthew and Luke diverge, there is no infallible criterion for deciding which of them represents the original.

Comparing the version of the teaching of Jesus in Matthew's Sermon on the Mount with the version of Luke, we find that about a third of the Sermon on the Mount appears in Luke's Sermon on the Plain; another third is found interspersed at many different parts in Luke, while the remaining third is absent altogether. Again, comparing the versions of the Lord's Prayer or the Beatitudes of the two Gospels, the most striking differences manifest themselves. It is almost impossible in these and many other cases to say whether Matthew or Luke is more likely to be a faithful representation of the original, and hence the character of the second source remains problematical as regards its details.

From the statement of Papias (c. 130), bishop of Hierapolis in Phrygia, "Matthew then composed the Logia in the Hebrew tongue and each one interpreted them as he was able," it has been argued that what Matthew wrote was not the present Gospel but the Logia source later embodied in it.

It follows that the Gospels represent three different strata of historical evidence. The first and most valuable is to be found in the sources of the synoptics—Mark and the Logia. It is from these that the earliest and best material for constructing the life of Jesus is to be obtained. Unfortunately the date at which these documents were written cannot be fixed with anything like certainty, but they cannot be much later than the

decade 50-60. They must certainly have been composed at a time when their statements might have been checked and challenged by the memory of living witnesses.

The secondary stratum is to be found in Matthew and Luke which probably belong to the period 60-80, though it is impossible to date them with anything like precision.

The tertiary stratum is the Gospel of S. John which cannot have come into existence much before 100. From an historical point of view its evidence is of much less value. The personal equation of the writer makes its presence felt especially in his version of the teaching of Jesus. There is much to be said for the position of Renan that "if Jesus spoke as Matthew makes him speak, he cannot have spoken as John makes him speak," not that this implies that the Johannine speeches are entirely fictitious, for, as Matthew Arnold puts it, "these speeches cannot in the main be the writer's, because in the main they are clearly beyond his reach." See Bible; Criticism; Jesus Christ; New Testament.

H. T. Andrews

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**Gosport.** Borough, naval port, and holiday resort of Hampshire, England. Incorporated in 1922, it includes the sea-side resort of Lee-on-the-Solent, and the old villages of Alverstoke, Forton, Hardway, and Rowner. Pop. (1951) 58,279. It stands on the western side of



Gosport arms

Portsmouth Harbour, and is 86 m. S.W. of London. Gosport and Fareham is a bor. constituency. A ferry and floating bridge connect it with Portsmouth. The chief church is S. Mary's, Alverstoke. It has various naval establishments, the most notable being the immense Royal Clarence victualling yard, Fort Blockhouse submarine base, the headquarters of the Flag Officer (Air), and Haslar Hospital (g.v.). Industries include yacht building and the making of electrical equipment, chemicals, and tools.

At the flying school established here during the First Great War.

and commanded by Lt.-Col. Smith-Barry, the Gosport system of flying instruction, basis of later R.A.F. methods, was evolved, and Gosport tubes—headphones, etc., for intercommunication between flying instructor and pupil—were invented.

**Goss.** Porcelain invented by William Henry Goss (1833-1906). It is remarkable for the delicate ivory of its body and the brilliance of the enamels employed in the heraldic decoration which was its earliest distinguishing feature. The ware is made at the Falcon potteries, Stoke-on-Trent. See Pottery.

**Goss, Sir John** (1800-80). A British organist and composer. Born at Fareham, Hampshire. Dec. 27, 1800, he became a chorister at the Chapel Royal in London. In 1838 he succeeded his master, Thomas Attwood, as organist of St. Paul's Cathedral, and he held that post until 1872, being knighted on his retirement. He composed many anthems, edited the Church Psalter and Hymnbook, and wrote The Organist's Companion. Goss died May 10, 1880.

**Gossage, Sir (Ernest) Leslie** (1891-1949). British air officer. Born Feb. 3, 1891, he went to Rugby and Trinity College, Cambridge. He received his first commission 1912, in the R.F.A., but in 1915 was seconded to the R.F.C., spending 3½ years in France. Squadron leader in the R.A.F., 1919, he rose to air marshal in 1940. He was air attaché at the British embassy, Berlin, 1930-31, served in Iraq (1934-35) and Aden (1935-36), commanded No. 11 (fighter) group (1936-April, 1940), and was air officer commanding Balloon Command (1941-44), and chief commandant and director general of the Air Training Corps (1944-46). He was created K.C.B. in 1941. He died July 8, 1949.

**Gossamer.** Fine filaments of cobweb, which may be seen in autumn floating in the air or entangled in the bushes. They are spun by the young of certain spiders, which are thus carried on the wind for considerable distances. The word is applied to a gauzy textile fabric.

**Gossan.** Geological term first used in Cornwall, England. Mineral deposits near the surface



Sir Ernest Gossage,  
British air officer

containing quartz and sulphides are frequently leached and oxidised, leaving an outcrop composed of a cellular mass of residual quartz and limonite (an iron oxide). This outcrop is known variously as gossan, ironstone (Australia), *colorados* (Spanish), *chapeau de fer* (French), *eisener Hut* (German).

**Gosse, Sir Edmund William** (1849–1928). A British man of letters. Son of P. H. Gosse (*v.i.*), he was born in London, Sept. 21, 1849. His mother was a Hebrew and Greek scholar. He was educated at private schools in Devon. Through the influence of Charles Kingsley, he became assistant librarian to the British Museum, 1867–75.



*Edmund Gosse*  
Russell

Translator to the board of Trade, 1875–1904, and lecturer in English literature at Trinity College, Cambridge, 1884–90, he was librarian to the house of lords, 1904–14. He was knighted in 1925, and died May 16, 1928.

Distinguished equally as poet, critic, translator, and biographer, Gosse's best remembered work is probably *Father and Son*, an autobiographical study, published anonymously in 1907, and crowned by the French Academy, 1913. His long series of critical biographies included Gray, 1882; Congreve, 1888; P. H. Gosse, 1890; Donne, 1899; Jeremy Taylor, 1904; Sir Thomas Browne, 1905; Patmore, 1905; Ibsen, 1908; Swinburne, 1917. His literary reviews in the *Sunday Times* were reprinted as *Books on the Table*, 1921, and his last book, *Leaves and Fruit*, appeared in 1927. His *Life and Letters* by E. Charteris was published in 1931.

**Gosse, Philip Henry** (1810–88). British naturalist. Born at Worcester, April 6, 1810, he spent his early years as a farmer in Canada and a schoolmaster in the U.S.A. Returning to England in 1839, he was sent to Jamaica to collect birds and insects for the British Museum. He then devoted his attention to marine zoology, and published and illustrated several books on the subject. He is the "father" in Edmund Gosse's *Father and Son*. He died at Torquay, Aug. 23, 1888.

**Göta**. River of S.W. Sweden. Issuing from Lake Wener, at its S. extremity, it flows S.S.E. to the Kattegat through two arms, the

southern one passing Gothenburg. About 65 m. long, it is navigable throughout its course. The cataract at Trollhättan is surmounted by locks constructed 1793–1800.

**Göta Canal**. Waterway of S. Sweden, connecting the Kattegat with the Baltic. Starting from Gothenburg, and utilising the Göta river and Lake Wener, the canal leads to Lake Wetter and then continues E. through small lakes to the Baltic at Mem, below Söderköping. Its total length is 240 m., the canalised portion being 55 m. It considerably reduces the sea journey between Gothenburg and Stockholm. The canal has 58 locks, a maximum alt. of 300 ft., and is 10 ft. deep. The work was begun in 1716, continued in 1753, and completed 1810–32. See Canal.

**Göteborg**. Swedish name for the town at the mouth of the Gota river. See Gothenburg.

**Göteborg and Bohus**. Län or government of Sweden. It is bounded on the W. by the Skagerrak and the Kattegat, area 1,989 sq. m. There are numerous coastal inlets and many islands. Fishing is an important industry. Pop. (1950) 556,799. The capital is Gothenburg (*q.v.*) or Göteborg.

**Götenhafen**. Name given by the Germans to the Polish port of Gdynia (*q.v.*) during their occupation of W. Poland, 1939–45. They made it a naval base.

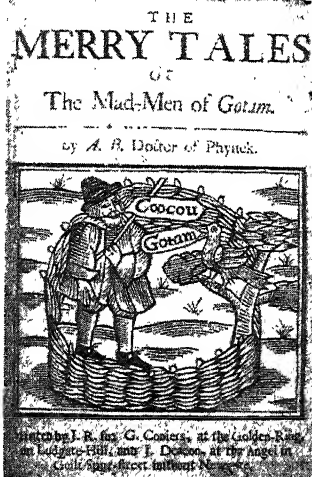
**Gotha**. A town of Thuringia. Formerly a residence of the ruling dukes of Saxe-Coburg-Gotha, it lies 15 m. W.S.W. of Erfurt, in the foothills of the Thuringian forest. It developed round one of Charlemagne's farming estates, but was first mentioned as a town of the Thuringian landgraves in 1189. The Saxon dukes frequently resided there in Grimmenstein castle, replaced 1643–46 by the Friedenstain palace. There are also a summer palace (1711), a theatre (1774), a town hall (1547, reconstructed 1666), an Augustine church (13th) and S. Margaret's (12th–15th cents.), an art gallery, two observatories, and a museum. Rly. rolling stock, aircraft, pottery, rubber, and soap were among its manufactures. During the Second Great War it was captured by the U.S. 3rd army, April 4, 1945. Pop. (1935) 47,848. See *Almanach de Gotha*.

**Götha**. German aeroplane of the First Great War. It was used in raiding London, Paris, and other centres and had a speed of 70–80 m.p.h. A biplane fitted with twin engines, it had pusher or tractor aircrews. The firm of Gotha pro-

duced several types of military aircraft during the Second Great War, notably the Go 242 transport glider.

**Gotham**. Parish of Nottinghamshire, England. It is associated with the phrases "wise men of Gotham" and "mad men of Gotham" once used as synonyms for rustic simpletons, much as Abderites was used in ancient Greece for the men of Abdera (*q.v.*). The men of Gotham figure in the jest books and plays of the 15th–16th centuries, notably in the Townley Mysteries and in the black letter collection entitled *Merry Tales of the Mad-Men of Gotam*.

The 20 tales or anecdotes in the collection referred to include the familiar jest of the men who hedged in a cuckoo to compel it to sing all the year, and the story of the man who, riding to market with two bushels of wheat, carried them



Gotham. Facsimile of the title page of an early edition of the old jest book

on his own neck so that his horse should not bear too heavy a burden.

Dekker, in *The Gull's Hornbook*, 1609, alludes to "the wise men of Gotham," as does the old rhyme:

Three wise men of Gotham  
Went to sea in a bowl;  
And if the bowl had been stronger  
My song would have been longer.

Washington Irving, in *Salmagundi*, 1807, called New York Gotham. Pop. (1951) parish, 1,364.

**Gothenburg** (Swed. Göteborg). Second largest city and chief exporting seaport of Sweden. It stands on the S.W. coast, 5 m. from the mouth of the river Göta, 285 m. by rly. S.W. of Stockholm. The old ramparts are replaced by boulevards adjoining the moat. The city is traversed by numerous

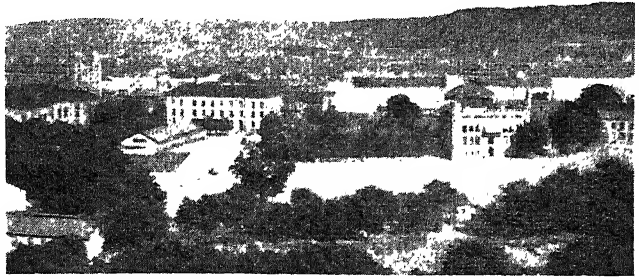
canals, has electric tramways, and is served by six railways. It has fine new quarters, handsome quays, and many parks, besides a cathedral, German and English churches, town hall, museum with pictures and statuary, city theatre, concert hall, and a university and library.

Its spacious harbour is generally ice free. Exports include timber, wood pulp, joinery, paper, cardboard, iron, glass, engineering products (ball bearings), matches, and fish. There are shipbuilding yards, flour mills, tanneries, sugar refineries, breweries, tobacco and margarine factories, and textile and other industries.

Founded by Gustavus Adolphus in 1619, it was at first settled by foreigners, chiefly Dutch, Scots, and English. During the Continental blockade of 1806 it was the chief British base in N. Europe. In 1802 the city suffered from a disastrous conflagration, and in Nov., 1920, the fishing harbour was seriously damaged by fire. During the Second Great War, sick and wounded German and British prisoners of war were sent here from Great Britain and Germany respectively for repatriation. Pop. (1955) 373,433.

**Gothenburg System.** Plan for dealing with the liquor traffic, introduced at Gothenburg, Sweden, about 1871. Adopted in Stockholm, in 1877, it spread to Norway and other countries, and was adapted in the United Kingdom by the Public House Trust (*q.v.*). Under the Gothenburg system a company may buy up existing licences and open in place of the old licensed houses a limited number of establishments for the sale of pure liquor, the salaried managers of which have no pecuniary interest in the sale of the liquor. Each company is under municipal control, and all profit beyond the realization of 5 p.c. on the capital expenditure is handed over to the civic authorities.

**Gothic** (late Lat. *Gothicus*). A term meaning connected with the Goths. Originally it was applied to certain distinguishing features of the middle ages as contrasted with those of classical times, and connoted rudeness or want of polish. The term is also applied to a certain phase of art and architecture; to type used for printing German black-faced and pointed letters formerly called black letter; and to the Mozarabic liturgy spoken by the Christians of Toledo, which was supposed to have been introduced into Spain by the Visigoths or Western Goths.



Gothenburg, Sweden. General view of the town from the Old Fort

The Gothic language is now generally assigned to the E. German branch of the Teutonic group. Originally spoken by the Visigoths, who in the 4th century occupied Dacia and Moesia, it survived until the 16th century in the Crimea. The alphabet, the invention of which is attributed to Ulphilas (*q.v.*), consisted of 24 letters, based upon the Greek, but also contained some Latin characters and runic symbols (*see* Rune). Some idea of this Gothic, or, rather, Moeso-Gothic language, is furnished by the fragmentary remains of the translation of the Bible by Ulphilas, discovered in Germany and now in the library of the university of Uppsala, and of one or two other documents, together with a portion of a calendar, found in Italy. *See* Goths; Typography.

**Gothic Architecture.** Manner of building practised in western Europe, especially in France, during about 1150–1550. Before the earlier date a traditional use of Roman forms had lingered on in some degree. The styles of art then practised are, therefore, now usually called Romanesque. The word Gothic at first was applied to Romanesque art as well and was used in the sense of barbaric. In reality, however, Gothic architecture is one of the most remarkable and refined types of building art ever practised. Gothic art is also frequently called medieval, but this also applies only to western Europe; medieval art in Persia or India, for instance, is not Gothic.

About the middle of the 12th century, especially in Paris and its neighbourhood, all the inherited forms of building were gradually changed under the influence of great dominating principles. The leading ideas were freedom, energy, and delight. There was a great outburst of building fervour, especially in churches, and under this impulse the building art

became entirely experimental and organic.

The chief problem the medieval builders set themselves to solve was the erection of vast cathedral buildings having high stone vaults. Now, arches and vaults are active things always tending to push outwards and fall; thus these buildings came to be conceived as problems in equilibrium. The higher central vaults of the nave were usually sustained on either side by lower vaults over the aisles, and arched stone props, called flying buttresses, were built from the outer walls of these aisles to the upper part of the main building or clerestory. These arched props were placed only at intervals between the windows; at the outer ends they rose from strong buttress masses built out from the aisle walls. In some of the greater French cathedrals there are two aisles on each side of the central span, the outer ones being the lower. At the middle point of all, over the intersection of the nave and transepts, a tall lantern tower was frequently built. The whole plan and design of this "arcuated" architecture turned on this question of constructive balance.

In all the minor parts and details, a similar general idea of functional service was developed, pillars became very tall, and large windows interrupted the walls between the supporting points. Still further beyond the actual needs of structure, the expression of tense and active service was increased by breaking up the edges of arches and pillars into many deeply cut mouldings, but these and the many delightful forms of tracery and sculpture were means to what was thought to be proper finish, and do not belong to the structural system. It was these details, however, which caught the eyes of the older students of Gothic architec-



ture, so that it came to be thought of as a picturesque grouping of towers and traceried windows and pinnacles and parapets.

The great spring-time of Gothic art was the hundred years from 1150 to 1250; then came a century or so of strong maturity, and then a gradual decline. In England, Canterbury Cathedral was built by a French master-mason from about 1175, but a clear expression of the Gothic spirit hardly became general before 1200. In the middle of the 13th century, Westminster Abbey and Salisbury Cathedral were being built, and great works were in progress at other cathedrals, and at scores of abbeys.

The development of Gothic architecture from first to last was so regular that examples can be dated with fair accuracy at sight. In England the style of work which is most characteristic of the 13th century has been called Early English, the typical work of the 14th century is Decorated, and that of the 15th century is Perpendicular. Although the perfecting of the stone-vaulted cathedral was the great task of Gothic architecture, yet the problems of all other buildings, such as the castle, bridge, town hall, and house, were also dealt with. Gothic and the other style-names here mentioned are all modern; to those who executed it their work was merely good building.

**Bibliography.** *Principles of Gothic Architecture*, M. H. Bloxam, 11th ed. 1882; *Development and Character of Gothic Architecture*, C. H. Moore, 1899; *A History of Gothic Art in England*, E. S. Prior, 1900; *Gothic Architecture in England*, F. Bond, 1905; *Medieval Architecture*, A. C. Porter, 1909; *Architecture for General Readers*, H. H. Statham, 1909; *Gothic Architecture in France, England, and Italy*, 2 vols., 1915; *Gothic England*, J. Harvey, 1947.

**GOTHIC REVIVAL.** As the aristocratic Georgian influence was supplanted by that of the newly enriched middle classes, British architects, disliking the changing conditions, sought refuge in a return to past styles. The Gothic revival began in the 18th century, when Horace Walpole built Strawberry Hill, but did not develop fully until the 19th. At first the movement found expression only in small country houses and cottages. S. Luke's Church, Chelsea, by James Savage, first building in revived Gothic in London, was erected in the 1820s, and is in a formal, yet imaginative, style. As the century progressed, however,

the teachings of Ruskin and the tenets of the religious revival stimulated architects to design churches, railway stations, town halls, schools, and libraries in imitation of medieval castles and cathedrals. Gilbert Scott's churches of S. Giles, Camberwell, and S. Mary Abbots, Kensington, resemble his S. Mary's Cathedral, Edinburgh, and Glasgow University in their elaboration of detail. The Albert Memorial in Kensington Gardens, London, probably represents revived Gothic at its most grandiose. Other notable examples are S. Pancras station, the royal courts of justice, 1874-82 (one of the last attempts to apply Gothic to a large public building), and the Prudential building in Holborn. Liverpool Cathedral, begun in 1903, and built of red sandstone, has a simple dignity, and may be considered a climax to the revival. See *Architecture*; *Cathedral*.

**Gothic Line.** German defensive system of the Second Great War in Italy. It extended from Pisa through the N. Apennines over the Futa Pass to Rimini. The great natural difficulties of the terrain had been elaborately reinforced by concrete emplacements, strongpoints, and other fortifications built by forced labour. In July, 1944, the German commander Kesselring fell back to it before the Allied advance from the S. The Allies captured Pisa on Sept. 2, and on the same day breached the line in the Adriatic sector. The fall of Rimini on Sept. 21 turned it in the E., and with the occupation of the Futa Pass on Sept. 23, after a ten-day struggle, the Gothic Line ceased to be an effective defence.

**Gothland** (Swed. *Gottland*). Largest island in the Baltic Sea, belonging to Sweden. It lies about 58 m. off the S.E. coast of the Scandinavian peninsula, and is 76 m. long and 30 m. broad, with an area of 1,220 sq. m. A level limestone plateau, with an alt. of from 80 ft. to 100 ft., encircled by cliffs and broken by bays, its soil is fairly fertile and the climate comparatively mild. It is well wooded and the marshes have been drained. Cattle, ponies, and sheep are reared, and cereals, sugar beet, fish, lime, stone, and timber are produced. There are some 80 m. of rly. and several small towns.

In the Middle Ages Gothland was a member of the Hanseatic League, and since then it has had various owners, becoming Swedish

in 1645. From its form and situation it has been called the Eye of the Baltic. The capital is Visby. Pop. (1950) 58,995.

**Gothland**, GÖTALAND or GÖTARIKE. Most southerly of the three old provs. of Sweden. It is subdivided into 12 läns or departments. Mountainous and forested in the N., and including lakes Wener and Wetter, it also contains some of the most productive soil in the country. Gothenburg (*q.v.*) is the largest town.

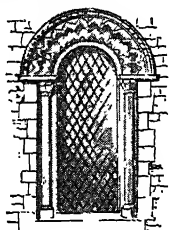
**Gothlandian.** System of stratified rocks typically developed in the island of Gothland in the Baltic, whence they extend into Scandinavia. The name has been used by some authors instead of the equivalent and better known term Silurian (*q.v.*).

**Goths.** Teutonic people of the Scandinavian branch. In the 1st century A.D. they appear to have been dwelling in the neighbourhood of the Baltic and the river Vistula. In the 3rd century they had migrated southwards and were spreading along the N. of the Black Sea and the Lower Danube. In the second half of that century they annihilated the army of the emperor Decius, were heavily defeated later by Claudius, and were finally allowed by Aurelian to settle in Dacia. There they were known as the Visigoths or Western Goths, while the tribes which remained in the E. were called Ostrogoths.

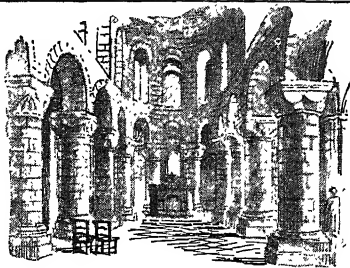
They dwelt on friendly terms with the Roman Empire for the next hundred years, but towards the close of the 4th century the pressure of the Huns (*q.v.*), who subjugated the Ostrogoths, forced the Visigoths to push over the Danube, and the emperor Theodosius compromised with them by allowing their settlement in Thrace. They had already adopted the Arian form of Christianity, taught by the missionary Ulphilas (*q.v.*).

After the division of the empire between the two young sons of Theodosius, a new migratory movement began among the Goths. Gothic cohorts had been embodied in the Roman army; an injudicious reduction in their pay stirred the Visigoths to revolt under the leadership of Alaric the Amaling. Alaric was pacified by being made governor of Illyricum, but in 400 he led his Visigoths to invade the Western Empire by way of N. Italy. He was held back for a time by Stilicho, but in 408, when Stilicho was dead, Alaric renewed his invasion, swept through northern Italy, and in 410 captured and

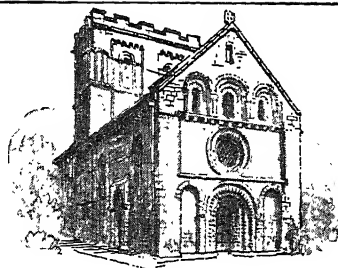
## ANGLO-NORMAN



Window, S John's, Devizes - 1160



S John's Chapel, Tower of London - 1078



West Front, Iffley Church, Oxford - c.1170

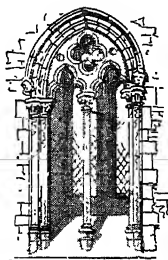
## EARLY ENGLISH



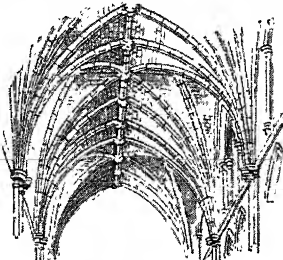
Early English foliage bracket, S'Albans Cathedral



Doorway, Aylesbury Church, c.1250

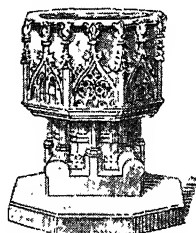


Window, Church at Stone, Kent - c.1240

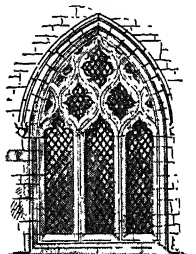


Vaulted roof, Westminster Abbey - c.1260

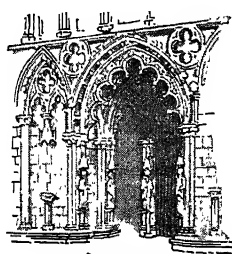
## DECORATED



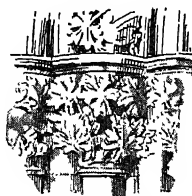
Font, Offley Church, Hertfordshire - c.1350



Window, S. Mary Magdalen, Oxford - c.1318



Doorway, Lichfield Cathedral - c.1330



Foliated capital, Chapter House, Southwell Cathedral - 1300

## PERPENDICULAR



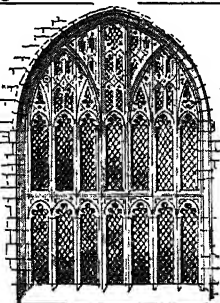
Capital, All Hallows' Church, Wellingborough - c.1450



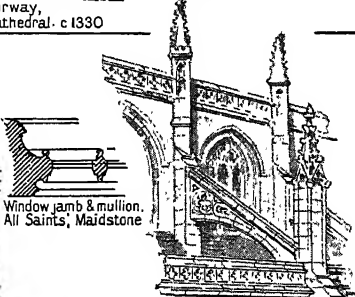
Base, S. Mary's, Oxford - 1488



Finial & Crocket, Magdalen College, Oxford - c.1456



Window, S. Mary's, Oxford - c.1475



Flying buttress, Sherborne - c.1470

## TUDOR



Flower ornament, Henry VII's Chapel, Westminster - c.1510



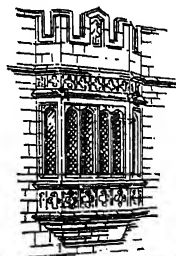
Tudor Rose



Ornamented moulding, Whitchurch, Somerset



Sutton Place, Guildford - 1523



Oriel window, Montacute, Somerset - c.1580



Section of same

## GOthic ARCHITECTURE: ITS DEVELOPMENT IN ENGLAND FROM ANGLO-NORMAN TO TUDOR

sacked the city of Rome for the first time since its capture by the Gauls 800 years before. Though the Goths wrought much devastation they were distinguished as being by far the least cruel of barbarian conquerors; and the impressive majesty which still attached to the name Rome is emphasised by the strange fact that Alaric chose not to set himself on the imperial throne, but to act as lieutenant of the emperor.

Although the Goths might have taken possession of Italy, Ataulf, who succeeded Alaric, in 411 withdrew his Visigoths into southern Gaul. There the Gothic kingdom of Toulouse was set up, in nominal subordination to the Roman empire. In 451 its king, Theodoric, joined with the Roman general Aëtius in inflicting a decisive defeat upon Attila (*q.v.*) and the Huns, when Theodoric himself was killed.

#### Gothic Kingdom of Toulouse

The kingdom of Toulouse embraced Spain as well as southern Gaul. The Goths, in fact, were granted the sovereignty of this territory as an official recognition of their services to the Roman empire in Spain, which had been conquered by Ataulf's successor Wallia. The peninsula had just before been overrun by a kindred but infinitely more cruel race, the Vandals (*q.v.*). Wallia's conquest, nominally the recovery of Spain from the Vandals, drove that people into the southern portion of it, which still bears the name of Andalusia; later they migrated to Africa. At the beginning of the 6th century the kingdom of Toulouse was overthrown by the Franks (*q.v.*) under Clovis, whose career was checked by the Ostrogoth Theodoric (to be distinguished from Theodoric the Visigoth).

In Spain the Gothic dominion continued. By the middle of the century it had reverted to the form of an elective monarchy which had prevailed among the Goths under the old tribal system. In one of the revolutions which are the normal accompaniment of elective monarchies, a prince named Ermengild, who had relinquished Arianism for orthodox Christianity, earned the martyr's crown by refusing to revert to Arianism, but in the reign of his brother Reccared, the Gothic people conformed to the prevailing creed of Western Europe and adopted orthodox Christianity.

The Church, hitherto hostile, now was friendly, but its friendship was more dangerous than its enmity, since the rulers fell

under the domination of Churchmen, who in their own interests hindered, instead of helping, all efforts to centralise the government. The Saracens invaded Spain, and the last Gothic king, Roderic, was overthrown in the great seven days' battle of the Guadalete in 711. The Moors overran the peninsula, and the surviving Goths were driven into the remote fastnesses.

The Ostrogoths had fallen under subjection to the Huns, but when the Hun empire broke up on the death of Attila they reappeared on the middle Danube. Thence about 470 they descended into the Balkan peninsula. Their young king Theodoric emulated the career of Alaric. Acting as lieutenant of the eastern emperor Zeno, he carried his Ostrogoths into Italy, overthrew Odoacer, the Teutonic chief who had deposed the last of the Roman emperors, and established himself as the viceregent of Zeno. He proved a soldier and legislator of exceptional ability; he died in 526.

The emperor Justinian resolved to make his dominion in Italy a reality; his general Belisarius (*q.v.*) temporarily wrested the supremacy from the Goths; after his departure they recovered their ascendancy under Totila, a worthy successor of Theodoric. Belisarius failed to overthrow him, but the task was finally accomplished by Narses. The Ostrogoths, their power completely shattered, retreated to the N., dispersed, and were never heard of again.

**Bibliography.** History of Latin Christianity, H. H. Milman, 4th ed. 1883; The Goths, H. Bradley, 1888; Decline and Fall, E. Gibbon, ed. J. B. Bury, 1909-14; Italy and her Invaders, T. Hodgkin, 2nd ed. 1916.

**Goto** or **GOTTO**. A group of islands off the S.W. extremity of Japan. They lie W. of Kyushu and 60 m. W. of Nagasaki. The largest are Fukai, Hisaka, and Nakadori. Fukai is 25 m. in length.

**Götterdämmerung.** German name for the Norse Ragnarök, or the Twilight of the Gods: the break-up of the power of the gods of Teutonic mythology which would result in a new cosmogony. This theme was adopted, and this name given to an opera in 3 acts with introduction, by Richard Wagner (*q.v.*). The fourth part of Der Ring des Nibelungen, the work was composed 1870-74, and first performed at Bayreuth, Aug. 17, 1876. Götterdämmerung contains the dramatic Death and Funerals of March of Siegfried.

**Gottfried von Strassburg** (*fl.* 1210). German poet. His unfinished epic Tristan, adapted from the French, is the only work that can with certainty be ascribed to him. In this poem, distinguished by style and beauty of expression, the author exhibits remarkable psychological insight.

**Göttingen.** Town in Lower Saxony, in the fertile valley of the Leine, 56 m. S. of Hanover, at the foot of the Hainberg (1,100 ft.). Though a picturesque town, with many buildings of the 14th to 16th century, Göttingen derives its international reputation exclusively from its university, founded by George II of England and Hanover in 1734-37; though young, compared with Prague, Heidelberg, and other seats of learning, it rapidly won fame for its historians, linguists, and jurists, and, from the 19th century, its physicists. Mentioned first in the 10th century as Villa Gutingi, Göttingen secured the privileges of a city c. 1200, became an important cloth-making centre, a member of the Hanseatic League, and between 1300 and 1500 attained considerable power. During the religious and the Thirty Years wars it declined and was partly destroyed, but it recovered under the Hanoverian dynasty. Many British scientists, statesmen, etc., studied at Göttingen, whose library (750,000 books, over 8,000 old MSS.) was one of the finest in Germany (some 200,000 volumes were destroyed by fire, in a mine where they had been placed for safety, shortly after the Second Great War). S. John's church, 12th and 14th centuries, S. James's, 14th and 15th, the town hall, 1369-71, the Junkernhaus, 16th century, and the old goose-girl fountain were notable buildings. Industries include the making of scientific instruments, pianos, and chemicals. Pop. (est.) 50,000.

In the Second Great War, Göttingen was overrun by infantry of the U.S. 1st army on April 8, 1945. It fell within the British zone of occupation. The university was reopened on Sept. 1, and, by the middle of 1946, had 4,800 students, among them men and women of the B.A.O.R., and nearly 250 professors and lecturers.

**Gottsched, JOHANN CHRISTOPH** (1700-66). German critic. Born at Judithenkirch, near Königsberg, he began early to lecture at Leipzig, where he became a professor in 1734. He sought to reform the German drama, and establish poetry as a matter of definite rule. For a time his influ-

ence was considerable, and he was regarded as a prophet of German literary culture, inspired by French models. He died at Leipzig, Dec. 12, 1766.

**Gouda** OR TER GOUW. Town of the Netherlands, in the prov. of Holland. It stands on the Yssel at its junction with the Gouw, 12 m. N.E. of Rotterdam, and is intersected in all directions by a system of canals. Notable buildings are the Groote Kerk (S. Janskerk), founded in 1485 and rebuilt in 1552, and the Stadhuis, built 1449-59. During the Second Great War it remained in German occupation from 1940 until the end of hostilities, May 6, 1945.

The principal industries are the manufacture of candles, cigars, twine, pottery, pipes, and the famous cheese. There is trade in cattle and cereals. Gouda canal connects Amsterdam with the Lek petroleum refineries. Pop. (1955) 40,442.

**Gouge**. As a geological term, it signifies a clayey attrition product, usually consisting of a fine-grained aggregate of minerals, and often occurring along the walls of a fault.

**Gough, HUGH GOUGH**, 1st Viscount (1779-1869). British soldier. Born at Woodstown, co. Limerick,

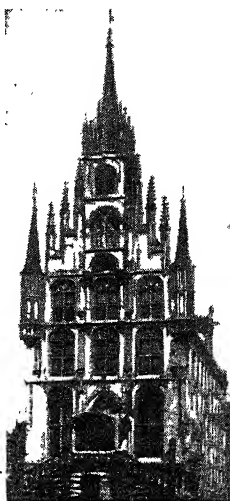


1st Viscount Gough, British soldier. After J. Jackson, R.A.

Nov. 3, 1779, he belonged to a family that had long lived in Ireland. In 1794 he entered the army, and took part in various expeditions against France and her allies. In 1809 he was in Portugal, and in the Peninsular War made a reputation by his gallantry and also as a regimental leader. After 1819 he served in Ireland until 1826.

In 1837 he commanded a division in India, whence he went to China as commander-in-chief during the war of 1841-42. In 1843 he was made c.-in-c. in India, and as such he took the field against the Mahrattas in 1843, and against the Sikhs in 1845. He crushed the Sikhs, his culminating victory

being at Sobraon, but in 1848 they rose again in arms. Gough met them at Chillianwalla, and, although that combat was not decisive, a victory at Gujarat, 1849, put an end to their resistance before the order for his recall reached him. In 1846, being already a baronet, he was made a baron, and in 1849 a viscount. Promoted field marshal in 1862, he died March 2, 1869.



Gouda. The Gothic Stadhuis, built in 1448-59, with a Renaissance staircase, 1603

and Unilever Ltd. He was made F.R.S. in 1933. His publications included *Fatigue of Metals*, and numerous papers on engineering and allied subjects in scientific journals.

**Gough, SIR HUBERT DE LA POER** (b. 1870). British soldier. A member of a distinguished Irish military family, he was born Aug. 12, 1870, and was educated at Eton and Sandhurst. Commissioned in the 16th Lancers in 1889, he served in the Tirah expedition, 1897-98, and throughout the S. African war. Appointed to the command of the 16th Lancers in 1907, he was promoted brig.-gen. 1911 and given command of the 3rd cavalry brigade at the Curragh, where his attitude in the political crisis arising from the Home Rule Act caused him to resign his commission rather than lead his troops against Ulster. The difficulty was adjusted, however, and at the outbreak of the First Great War he took his brigade to France. He was later given com-



Sir Hubert Gough, British soldier

mand of a division, and in 1916, of the 1st corps. In July, 1916, he was created K.C.B. and put in command of the 5th army, which he had led during the battle of the Somme. In 1917 he was for some time in charge of the third Ypres offensive, where his tactics were criticised by some as unduly costly in casualties. When the final German offensive opened March 21, 1918, the 5th army bore the brunt of the enemy attacks. Although Gough did everything possible to stem the German advance, his troops fell back with heavy losses. He was held responsible for the disaster, recalled, and retired. The 5th army was disbanded. In his book *The Fifth Army* (1931) Gough vindicated his conduct of affairs in 1918, and this vindication was later supported by Lloyd George, who, as premier, had been instrumental in his recall, and given public expression in parliament. It was established that the tactical dispositions of the 5th army were the only ones possible in the circumstances, and that the failure was largely due to Haig's faulty dispositions of the reserves.

In 1919 Gough was appointed head of the British mission to the Baltic States. He retired from the army in 1922 with the rank of general. He joined the Home Guard as a private in 1940, and later became a zone commander, resigning in 1942.

**Gough, JOHN BARTHOLOMEW** (1817-86). American temperance lecturer. Born at Sandgate, Kent, England, Aug. 22, 1817, he went to America, and in 1831 became a bookbinder in New York. Drunkenness and a dissolute life, which hastened the death of his wife and child, brought him to destitution. Befriended by a Quaker, he took the pledge in 1842, and soon became a powerful and convincing lecturer on temperance, himself furnishing a useful illustration of his text. He died Feb. 18, 1886.

**Gouin, FÉLIX** (b. 1884). French lawyer and politician. Gouin was born Oct. 4, 1884, at Peypin, Bouches-du-Rhône, studied law at Aix-en-Provence, and was admitted to the Bar in 1907. A member of the S.P. from the age of 18, he became deputy for Aix in 1924. One of



Félix Gouin, French lawyer and politician

the 80 deputies who voted against Pétain in 1940, Gouin defended Léon Blum at the Riom trial (*q.v.*). Appointed by the Socialist party as its representative on the French national committee in London, he escaped from France via Spain, where he was interned for three months, and reached London, Aug., 1942. A member of the provisional consultative council at Algiers, he was elected its president (speaker), became president of the constituent assembly in Paris, Nov., 1945, and succeeded Gen. de Gaulle as premier, Jan., 1946. Vice-premier in Bidault's ministry, June, 1946, he was minister of state in Blum's "caretaker" government, Dec., 1946, and in Ramadier's first 1947 government. He was criticised in connexion with the public management of certain wine transactions.

**Goujon, JEAN** (c. 1515-67). A French sculptor. A native of Normandy, probably born in Rouen, in 1541-42 he executed various sculptures for the cathedral and the church of S. Maclou in that city. Shortly afterwards he removed to Paris, where his connexion with the Louvre established and preserved his reputation. He took a prominent part in the decoration of the building—his four Caryatides being famous—and some of the finest examples of his genius have found a home there.

**Goulard's Extract.** Strong solution of lead subacetate. It is prepared by boiling lead oxide and lead acetate with water. It was discovered by Thomas Goulard (1720-90) of Montpellier, and in a diluted form is known as Goulard's lotion or water. Dilute solution of lead subacetate is used as an astringent lotion.

**Goulash.** Thick stew of Hungarian origin, made from beef and flavoured with paprika. At bridge, a goulash is a type of deal sometimes resorted to when all four players have passed a hand without bidding. Each hand is sorted into suits, the four hands are piled, and the cards are cut once, but not shuffled, before dealing. They are dealt five at a time, five at a time again, and then three to each player. The idea is that a freak deal may result; but if anyone objects to a goulash it cannot be played.

**Goulburn.** River of Victoria, Australia. It is 345 m. long, a tributary of the Murray, which it joins 9 m. E. of Echuca. It flows in a N.W. direction through good agricultural and gold-bearing

country, and is stocked with trout. It is navigable in its lower reaches.

**Goulburn.** Town of New South Wales. A rly. junction 137 m. S.W. of Sydney on the main line to Melbourne, it stands on the Wollondilly river, in an agricultural, pastoral, and dairying district. It possesses two cathedrals, Anglican and Roman Catholic, fine public buildings, and noteworthy educational facilities. Industries include woollen mills, brick, tile, and pottery works, tanneries, boot factories, breweries, and flour mills. Pop. (1954) 19,183.

**Gould, SIR ALFRED PEARCE** (1852-1922). British surgeon. Son of George Gould, a Baptist minister, he was educated at Amersham Hall School, Reading, and University College, London, where he graduated in medicine. In 1877 he joined the staff of the Westminster, in 1882 of the Middlesex Hospital. His reputation as a surgeon won for him the position of president of the Medical Society of London and other honours. He was also vice-chancellor of London university and president of the Röntgen Society. Knighted in 1911, Sir Alfred wrote several works on surgery, notably *The Elements of Surgical Diagnosis*, 5th ed. 1919. He died April 19, 1922.

**Gould, BENJAMIN** (1824-96). American astronomer. Born in Boston, Sept. 27, 1824, he was educated at Harvard and spent two years studying at European observatories. He took charge of the coast survey longitude work in 1852, and retired in 1867 to engage in his life work, the mapping of the southern heavens from the observatory he established at Córdoba

Argentina. He was a pioneer in using photography for measuring star positions. Founding the *Astronomical Journal* in 1849, he edited it, with interruptions caused by the Civil War and by his absence in S. America, until his death, Nov. 27, 1896.

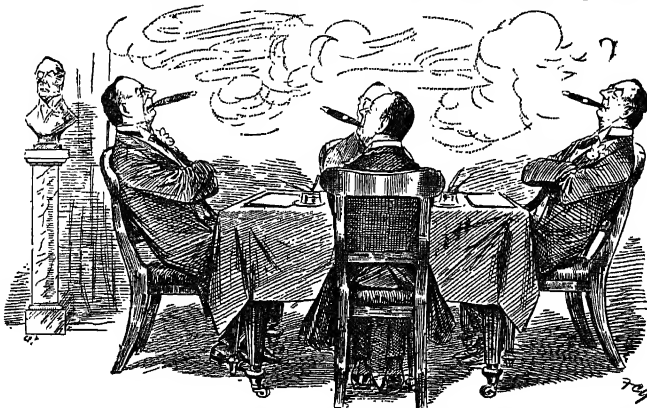
**Gould, SIR FRANCIS CARRUTHERS** (1844-1925). British caricaturist. Born at Barnstaple, Dec. 2, 1844, for many years he was a member of the London Stock Exchange, where his talent for producing clever sketches of a humorous and satirical order became well known. Having illustrated the Christmas numbers of *Truth* with remarkable acceptance, he formally embarked upon the profession of caricaturist in 1887, working for the *Pall Mall Gazette*.

Later he transferred his services to the *Westminster Gazette*, of which his cartoons soon became an outstanding feature that made the initials F.C.G. famous. His favourite subjects for caricature were Balfour and Joseph Chamberlain, both of whom appeared in every conceivable form of zoological disguise. He also embellished with caricatures the parliamentary gossip of Sir Henry Lucy in the *Strand Magazine* during the 1890s. Many of his political pictures, always uncompromisingly in the interests of the Liberal party, appeared in volume form, and his other



*Francis Carruthers Gould*

E. H. Mills



Sir F. Carruthers Gould. A *Westminster Gazette* cartoon of 1903, "A Meeting of the Tariff Committee of the Birmingham Liberal Unionist Association," the joke being that each figure represents Joseph Chamberlain, one of "F.C.G.'s" favourite subjects

publications included Froissart's *Modern Chronicles, 1902-03*. He was knighted 1906; died Jan. 1, 1925.

His eldest son, Alec (1870-1948), was a marine and landscape painter whose work is represented at S. Kensington and in other national collections.

**Gould, GERALD** (1885-1936). British poet, critic, and journalist. Educated at Norwich, University College, London, and Magdalen College, Oxford, Gould was a fellow of Merton, Oxford, 1906-16, leader writer of the *Herald*, 1915-19, associate editor of the *Daily Herald*, 1919-22. His *Collected Poems* were published 1929. His other publications included *The Helping Hand*, 1918; *The Coming Revolution*, 1920; *The Musical Glasses*, 1929. He was, however, best known as a reviewer of fiction in the *Observer*, the *Daily News*, and elsewhere. He created a new style in this field, introducing wit as well as judgement into his notices. He died Nov. 2, 1936.

Barbara Bodichon Ayrton Gould (c. 1880-1950), his wife, a daughter of Prof. W. E. Ayrton and Mrs. Hertha Ayrton, was an organizer and politician. She served on various commissions, including the royal commission on the civil service, 1929-31, and was a member of the executive committee of the Labour party 1930-50, being chairman 1939-40. She sat as M.P. for Hendon North, 1945-50. Their son, born 1921, achieved a reputation as a painter and art critic under the name Michael Ayrton.

**Gould, JAY** (1836-92). American capitalist. Born at Roxbury, New York, May 27, 1836, he left



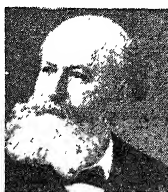
Jay Gould,  
American capitalist

his father's farm at the age of 16 and entered an ironmongery store. Here he remained until 1856, spending his spare time in the study of surveying. After a venture in the lumber trade, he took advantage of the rly. panic of 1857 to buy a controlling interest in the Rutland (N.Y.) Washington rly. Two years later he opened a broker's business in New York.

In 1856 he became president of the Erie railroad, of which he had obtained the controlling interest, and manipulated rly. stock to enormous profit. The Union Pacific, Missouri Pacific, Wabash, Texas Pacific, St. Louis and Northern,

and St. Louis and San Francisco rlys. were all controlled by him, whilst in 1881 he formed the Western Union Telegraph System. He died Dec. 2, 1892.

**Gounod, FRANÇOIS CHARLES** (1818-93). French composer. He was born, the son of a painter, at



Ch. Gounod

Paris on June 17, 1818, and entered the conservatoire of Paris in 1836. After studying there under Fromental Halévy, he went to Italy as winner of the Prix de Rome, 1839. On his return

to Paris he became organist at the chapel of the Missions Étrangères. His name was brought into public notice by the production of his first opera, *Sappho*, in 1851. His next operatic success was in 1858 with a clever setting of Molière's *Le Médecin malgré Lui*. Gounod's version of Goethe's *Faust*, which set him in the forefront of operatic composers, was produced in Paris in 1859. Its first performance in London was in 1863.

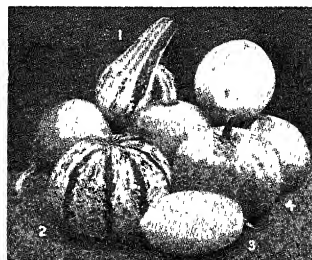
Henceforth his work secured a ready hearing, and there came *Philémon et Baucis*, 1860, and *La Reine de Saba*, 1862, which has always met with more success abroad than in France. *Mireille*, on a libretto of the Provençal poet Mistral, appeared in 1864, and his fine rendering of the story of *Romeo and Juliet* in 1867. Meanwhile he had also been writing much other music, sacred and secular, notably the *Mass* of St. Cecilia, 1855. Among his other sacred music should be remembered two other *Masses*, 1876 and 1887, and the two oratorios *The Redemption* and *Mors et Vita*, produced at the Birmingham Festivals in 1882 and 1885 respectively. Gounod, who came to England during the Franco-Prussian War, composed a cantata, *Gallia*, for the opening of the Royal Albert Hall, 1871. He died at St. Cloud, Oct. 18, 1893.

Despite much severe criticism of his sometimes over-florid and over-sweet style, Gounod's work at its best has a permanent interest. His operas are untiringly welcomed in all countries, his *Masses* are frequently sung, some of his songs, e.g. the *Ave Maria*, a melody boldly superimposed on the first prelude of Bach, are universally familiar.

He exercised a great influence on the following generation of French composers. Gounod was personally a man of wide culture and deep religious feeling, both reflected in his work, and a volume of his autobiographical notes and reprinted articles was pub. 1896. *Pron. goo-no.*

**Gourd** (Lat. *cucurbita*). Half-hardy annual trailing plant of the family Cucurbitaceae, mostly natives of India. The edible varieties of gourd or pumpkin are grown in the same way as the vegetable marrow. They can be cooked as a vegetable while young and tender, or used to make pumpkin pie when ripe. The largest sort is the Hundredweight gourd. Ornamental gourds make a striking garden decoration when trained to cover arches or trellis-work; they are of various shapes, and brightly coloured. Among them are the apple, pear, orange, and egg-shaped, and the Turk's cap.

The best way to grow gourds is to sow the seeds singly in 3-in. pots



Gourd. Examples of some ordinary forms. The species shown include: 1. Vegetable Marrow; 2. Water Melon; 3. Winter Melon; 4. Great Yellow Gourd

in a greenhouse in April, planting the seedlings out of doors at the end of May in rich soil, and watering freely in dry weather.

The story of Jonah and the gourd (Jonah 4) is well known. The rind of several varieties of gourd, including the bottle-gourd (*g.v.*), is used by natives to form flasks or bottles for carrying liquids.

**Gourgaud, GASPARD, BARON** (1783-1852). A French soldier. Born Sept. 14, 1783, at Versailles, he rose to the rank of general in the Napoleonic campaigns, and after the final overthrow of Napoleon accompanied his master to St. Helena, where he assisted him in the preparation of his *Memoirs*. He published an account of the campaign of 1815, and a vehement refutation of Scott's *Life of Napoleon*, but his most important book is his *Journal inédit de Ste.-Hélène*, first published in 1899. He died in Paris, July 25, 1852.



**Gourko** OR GURKO, JOSEPH VLADIMIROVICH (1828-1901). A Russian soldier. Scion of a noble



Joseph Gourko,  
Russian soldier

Lithuanian family, he was born Nov. 15, 1828, and was appointed an officer of the Russian imperial guard. He rose rapidly in rank, and served in the Crimean War,

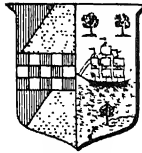
but his military reputation rests entirely upon his achievements against the Turks in 1877-78. He led a Russian detachment across the Danube and seized Tirnova; he then drove the Turks from the Shipka Pass, and pressed deeper into their empire. Falling back, he defended the Shipka against Turkish efforts at recapture, and had a large share in the operations that led to the fall of Plevna. One operation was an advance on Sofia, which he occupied, having previously driven the Turks from Orkhanie. Near Philippopolis he gained one of the few real victories of the war, and he had won other successes when the struggle ended. Gourko was afterwards governor of St. Petersburg and of Odessa, while from 1883 to 1894 he was governor-general of Poland. He died Jan. 29, 1901.

**Gourmont, R  MY DE** (1858-1915). French literary critic and scholar. Born April 4, 1858, at Bazoch  , Orne dept., France, he came under the influence of Huysmans, G  rard de Nerval, and Mallarm  , and is remembered as a champion of the symbolist movement in modern French poetry, a scholar, and a writer who to a distinguished literary style added philosophic insight. From 1883 to 1891 he held an appointment at the Biblioth  que Nationale, Paris. Afterwards he became editor of *Le Mercure de France*. He wrote *Les Fran  ais au Canada*, 1888; *Proses Moroses*, 1896; *Le P  lerin du Silence*, 1896; *Le Livre des Masques*, 1896-98; *Esth  tique de la Langue Fran  aise*, 1899; *Promenades Litt  raires*, 1904-6; *Une Nuit au Luxembourg*, 1906; *Promenades Philosophiques*, 1906-8; *Le Probl  me du Style*, 1907; a volume of verse, *Divertissements*, 1912. Two of his works, *Lettres    l'Amazone* and *Pendant la Guerre*, were published posthumously, 1916. He died Sept. 27, 1915.

His brother Jean (1877-1928) contributed to *Le Mercure de*

France. He published poems; a novel, *La Toison d'Or*, 1908; and *Souvenirs de R  my*, 1925.

**Gourock.** A burgh, residential town, and holiday resort of Renfrewshire, Scotland. It stands on the S. side of the Firth of Clyde adjoining Greenock. It is connected with Glasgow by steamer, rly., and motor bus. Ashton is the holiday dist.



Gourock arms

The town has industries, connected with shipping and is itself a centre for local shipping, while its sheltered bay is much frequented by yachts. There are golf links here. Legendary and historical associations cling to a stone called *Granny Kempoch*.

Gourock became a burgh in 1694. Pop. (1951) 9,017.

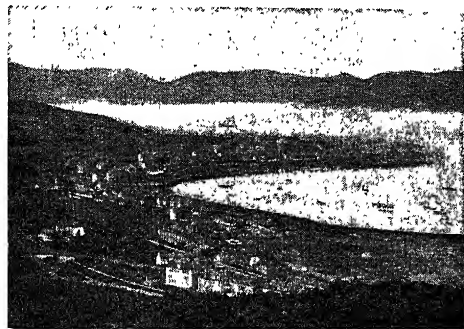
During the Second Great War, when the London docks became the target of concentrated attacks by the Luftwaffe, the Clyde anchorages emergency port was organized in the safe, enclosed waters off Gourock to handle ships which would normally have docked in London. Between Sept., 1940, and Aug., 1945, 1,855 ships discharged or loaded overside more than 2,000,000 tons of cargo.

**Gout** (Lat. *gutta*, drop, humour). Disorder of bodily chemistry. It is characterised by excess of uric acid in the blood, and deposit of urate of sodium in the joints and their vicinity. The changes in metabolism which cause the condition are not understood. Gout cannot occur without excess of uric acid, but the latter is not the cause of gout. Hereditary influences are an important predisposing cause; alcoholism and over-eating without sufficient exercise are frequent antecedents. Workers in lead are particularly liable to the disease. Males are more frequently affected than females, and the disease is exceptional in people who are under the age of 35.

Three forms are generally recognized: acute, chronic, and irregular gout. In the acute attack there may be premonitory symptoms, such as twinges of pain in the small joints of the hands and

feet, and indigestion. The attack most often begins in the early hours of the morning, with violent pain in the joints of the big toe, which rapidly become hot and swollen. Sometimes knee or finger joints are first to be affected, and several joints may be involved simultaneously, or in rapid succession. The temperature rises to 102   or 103  . The pain lessens in the course of a few hours, but recurs towards evening for two or three days, the severity of the symptoms gradually abating.

After the first attack, the joint affected appears to return to the normal condition, but repeated attacks result in more or less stiffness and swelling of the articulations. Ultimately the condition passes into the chronic form, the joints being permanently enlarged.



Gourock, Scotland. The town and bay on the south side of the Firth of Clyde

deformed, and irregular. So-called "chalk stones" are formed about the knuckles and elsewhere, and the skin over them is stretched and sometimes ulcerated. Deposits of sodium urate in the cartilages of the ear are common. Besides local signs the patient usually suffers from dyspepsia and more or less continuous ill-health. Irregular gout is a condition seen in persons who, while not suffering from definite attacks of gout, have a tendency to the disease often due to hereditary influences. The tendency may manifest itself in a number of ways, among which are liability to eczema, biliousness, thickening of the arteries, headache, neuralgia, diabetes, etc.

With proper care, gouty persons may live for many years, but long-continued attacks are likely to bring about Bright's disease, uraemia (*q.v.*), changes in the arteries, and affections of the heart. In an attack of acute gout, the affected limb should be raised, and the pain may be relieved by warm fomentations. Colchicum is the

sovereign, age-old remedy, and the administration of citrate of potash or lithium is useful. Chronic gout must be kept under control by carefully regulated living.

Meat should be taken sparingly, and substances like sweetbreads, liver, and kidney, as well as most soups and meat extracts, should be avoided. Fresh fish, eggs, milk, butter, and fresh vegetables are recommended. Red wines and champagne are more harmful than white wines and whisky. Regular sufficient daily exercise and attention to the bowels are important. Overwork and worry should be avoided.

**Gout Fly** (*Chlorops taeniopus*). Small fly whose larvae or grubs attack the young ears of spring barley, causing them to become much swollen and to fail to grow out of the ensheathing leaves.

**Govan.** Western suburb of Glasgow, until 1912 a separate municipality. It lies on the S. side of the Clyde opposite Glasgow proper, although part of the parish of Govan is N. of the river, and gives its name to a burgh constituency. It has a rly. station and is also connected with Glasgow by buses and a rly. that goes under the Clyde. The chief industry is shipbuilding, Harland and Wolff having immense yards here. There are also docks, and steamers call at the pier. Also at Govan are engineering works and foundries. The principal buildings are the parish church, with some early Christian monuments in its churchyard, and S. Mary's United Free church. Here is Elder Park. Pop. (1951) 311,984.

**Governess-cart.** Low-hung, small, two-wheeled, one-horse carriage holding four persons. It has two seats, facing inwards, and a small door at rear. Usually drawn by a pony or quiet cob, it is uncomfortable, but safe, and is named from its former common use as a children's conveyance.



Governess-cart. Low, two-wheeled vehicle used on country roads

## GOVERNMENT: STATE ORGANIZATION

G. W. Keeton, LL.D., Dean of the Faculty of Laws, Univ. Coll., London

*This outline of the purpose and forms by which countries are governed may be supplemented by reference to Democracy; Fascism; Feudalism; Monarch; Tyrant, etc., and to such subjects as Cabinet; Commons, House of; President; Soviet, etc.*

The term government (Lat. *gubernare*, to steer or direct) describes the work of those who guide the ship of state, and are ultimately responsible for its safety and well-being.

Historically, government has been of three kinds—monarchical, aristocratic, or democratic. In a monarchy, a single person exercised the main governmental functions; in an aristocracy, the functions were exercised by an order or class; and in a democracy, the government was ultimately responsible to the adult population as a whole. This classification is rooted in Greek political philosophy, and particularly in Aristotle, who separated three "good" types—monarchy, aristocracy, and constitutional government—from three perverted types—tyranny, oligarchy, and democracy. The line of differentiation was between government by the one, the few, or the many, and the good or bad term was applied as the rulers ruled in the public interest or for their own selfish ends. To Aristotle, however, an aristocracy was a government by an order specially qualified by abilities, training, and experience for the work of government. This ideal was sometimes achieved in ancient Athens, and, at its best, the rule of the Whigs in England in the 18th century approached it. When, however, the Whig rule degenerated to the promotion of the interests of their order, it was more accurately termed an oligarchy.

### Possible Tyranny of Majorities

Aristotle used the term democracy, not for an ideal state, but for a debased condition in which political power was in the hands of the unreflecting and uneducated mob. Particularly since the French Revolution, however, the democratic form of government has been idealised, and there has been attributed to it what ought to be the characteristics of all good government, i.e. that under it all laws and political institutions promote the well-being of the community as a whole. The political philosophy of Western Europe in the 19th century assumed that this object could most certainly be achieved by letting government rest on the active consent of the adult population. It is obvious,

however, that, if pushed to extremes, such theories of government might lead (and in fact have led) to the tyranny of majorities over minorities, which becomes all the more acute where there is a difference of blood, creed, or class between the dominant majority and the minority. Experience has shown that democratic government has worked well only in those countries which have possessed for long periods a strong feeling of unity, and in which majorities, in their period of dominance, are prepared to accept limits to their legal powers, and to use self-restraint in order that similar forbearance may be shown towards them when the positions are reversed.

### Theories of Karl Marx

During the past century, the problem of government has been approached afresh in the light of the theories of Karl Marx (*q.v.*). From the Marxian point of view, government in western society was simply the domination of the community by a class in its own interests. The object of political endeavour should, therefore, be to establish the classless society in which government would then become the genuine instrument of the community as a whole. To achieve this end, Marx held that it would be necessary to pass through a transitional period in which the dictatorship of the proletariat would bring about the necessary social, economic, and political transformations by means of which all privileged orders would be abolished. These theories have formed the basis of government in the U.S.S.R. since 1917. though to the detached observer it might perhaps seem that while the old privileged orders have been swept away, a new governing class, the Communist party, has been introduced. Further, the claim of the new order to rule in the interests of the community as a whole can be assessed by precisely the same tests which are applicable to other political systems.

Besides the classification of governments recognized by Aristotle, there is a different classification into unitary and federal governments. In a unitary state, the central government possesses unlimited power, so that although local governments may exist

within the state, they are ultimately subordinate to the power of the central government, which can modify their powers as it chooses. In a federal state, on the other hand, sovereign power is divided between central and local governments, sometimes (as in the case of the U.S.A.) by a written constitution which prescribes the functions of each, and the central government can encroach upon the authority of the local government only to a defined limit. There are federal governments in the U.S.A., Canada, Australia, Switzerland, and various Latin-American states. In form, too, the Soviet Union is a federation.

#### Spheres of Government

In Western political thought, government is divided into three main spheres—legislative, judicial, and executive. The legislature is the organ which makes the laws, the judiciary interprets and applies them, and the executive enforces them. In the 18th century, Montesquieu traced the excellence of the English constitution to the fact that there had been a complete separation of these powers, so that no one department of government was able to override the other two. This was in contrast with France, where all power was concentrated in the hands of the monarch, with resulting impairment of individual liberty. The ideas of Montesquieu greatly influenced the political thought of the next half century, and in particular the constitution of the U.S.A., where the doctrine of separation of powers was pushed to its farthest limits. The result is that at times, when the president and congress are at variance, the execution of government policy may be held up or even abandoned altogether.

Even in origin, it is possible that the theory of Montesquieu is founded upon a misunderstanding of the English constitution, where full sovereignty resides in parliament, but the driving force is supplied by the cabinet, which contains the chief heads of executive departments. Today, moreover, the great extension of governmental activity into all aspects of social life has meant that, in practice, the theory of the separation of powers has had to be abandoned. It has also concentrated attention upon the vast growth in the powers of the great departments of state, upon which modern legislation increasingly confers wide legislative and judicial powers.

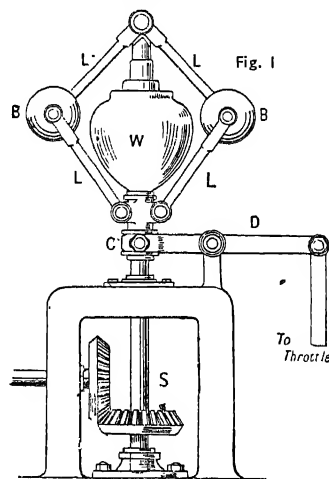
**Bibliography.** The State, Woodrow Wilson, 1899; Elements of Politics, H. Sidgwick, 4th ed. 1919; Modern Democracies, Lord Bryce, 1921; Federal and Unified Constitutions, A. P. Newton, 1923; The Queen's Government, Sir Ivor Jennings, 1954; Government and Parliament, Herbert Morrison, 1954.

**Governor.** In mechanics, an apparatus for regulating the working speed of an engine under varying conditions of load. Most governors for steam and internal combustion engines follow the original ball governor of James Watt. The function of a governor is to adjust the mean driving torque of an engine or turbine to the mean resisting torque of the driven member (machine, generator, etc.) by increasing or decreasing as necessary the energy supplied. This can be accomplished either by altering the point of cut-

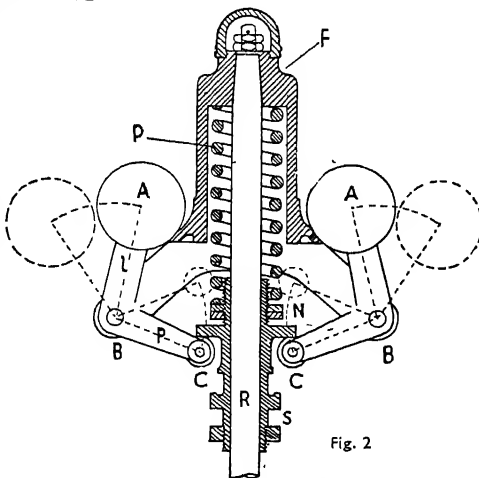
marine engines the governor is actuated by changes in the acceleration of the reciprocating parts (Aspinall governor).

Fig. 1 shows a loaded Watt governor (or Porter governor), which was in universal use for many years, but was found to be too sluggish in action for engines running at other than slow speeds. Moreover, it is unsuitable for any but stationary engines. But the spring-loaded governor, one type of which is illustrated in Fig. 2, does not depend upon gravity for its operation and can be adapted for high speeds of revolution, so that it can be used on moving vehicles and with the shaft horizontal if required.

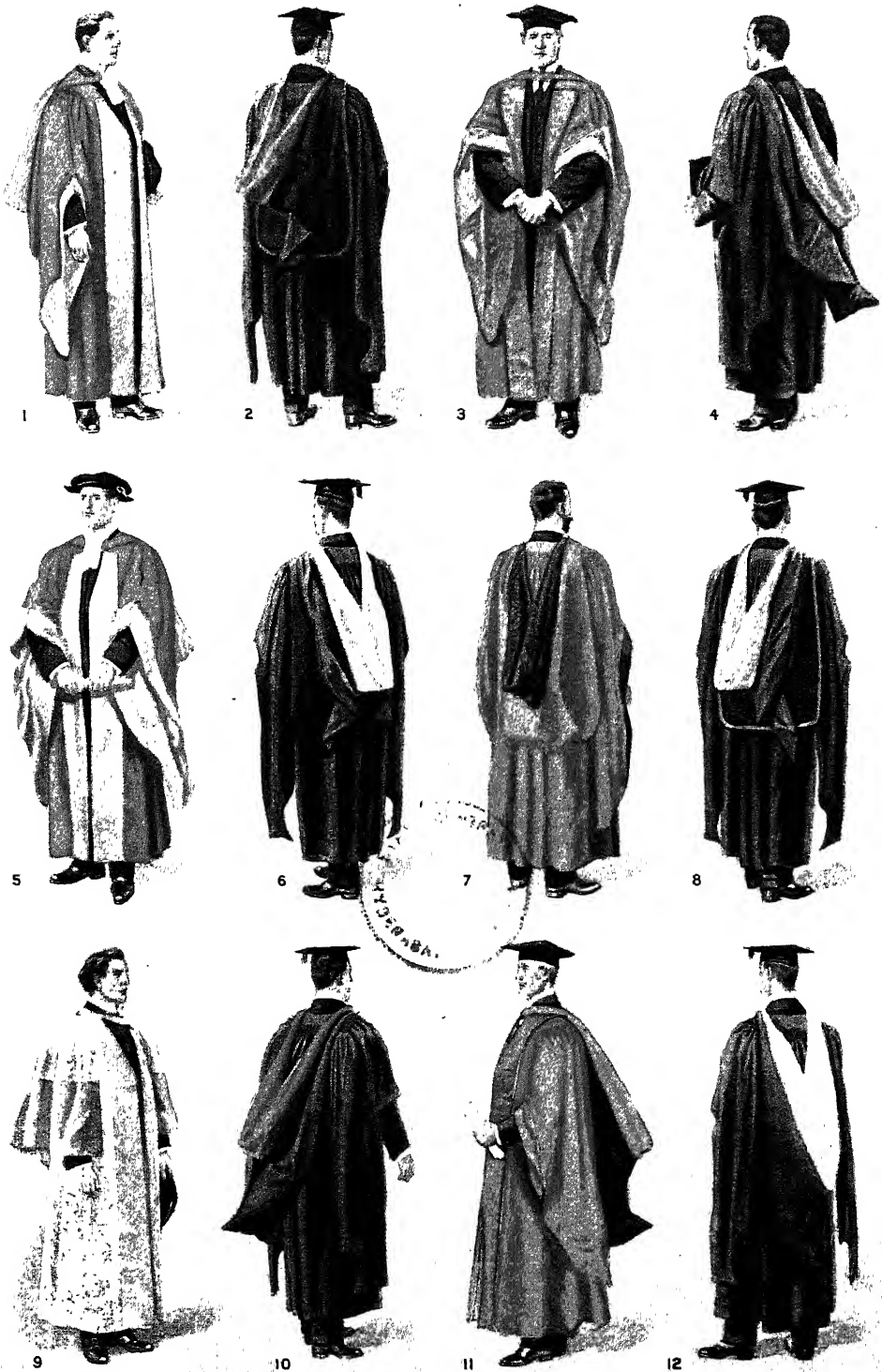
In the case of Fig. 1, S is a vertical shaft rotated by the engine through a bevel gear. Four links LLLL connect two metal balls BB with the top of S and with a weight W grooved near the bottom at C. The weight is able to move freely up and down S. When the speed increases, the radius of action of the balls BB increases and the sleeve C, carrying the weight W and the end C of the forked lever D, lifts and partly closes the throttle, thus diminishing the supply of steam to the engine. When the speed decreases, C falls and the throttle opening is increased. The higher the normal speed of the engine, the greater W must be to obtain a reasonable movement of C for a small change of speed. If the load changes rapidly, the governor does not respond quickly enough and "hunting" (i.e. the exceeding by the engine of the designated speed) will occur.



off or by throttling the steam (steam engine or turbine), or by varying the supply of fuel to the cylinder (internal combustion engine). In small gas engines the governor operates by cutting out explosion strokes, but this leads to undesirable torque fluctuations and necessitates the fitting of very heavy flywheels. Most governors operate by changes in centrifugal force with changes of speed, but in the case of a number of



Governor: in engineering. Fig. 1. Loaded Watt governor. Fig. 2. Spring-loaded governor; see text for explanation of lettering



1. London, LL.D. 2. London, M.A. 3. Glasgow, LL.D. 4. Glasgow, M.A. 5. Cambridge, LL.D. 6. Cambridge, M.A.  
7. Birmingham, LL.D. 8. Birmingham, M.A. 9. Oxford, Mus. Doc.; Oxford D.C.L. is similar in shape, but the robe  
is scarlet cloth with crimson silk facings. 10. Oxford, M.A. 11. Edinburgh, LL.D. 12. Edinburgh, M.A.

**GOWNS AND HOODS WORN BY LL.D.s AND M.A.s OF THE PRINCIPAL BRITISH UNIVERSITIES**  
Specially drawn by J. F. Campbell from gowns lent by Edc and Ravenscroft, London

To face page 3864.

See over



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13. Aberdeen, LL.D. 14. Aberdeen, M.A. 15. St. Andrews, LL.D. 16. St. Andrews, M.A. 17. Liverpool, LL.D.  
18. Liverpool, M.A. 19. Manchester, LL.D. 20. Leeds, M.A. 21. Durham, D.C.L. 22. Sheffield, M.A.  
23. Dublin, LL.D. 24. Wales, M.A.

**GOWNS AND HOODS OF LEADING BRITISH UNIVERSITIES (AND DUBLIN UNIVERSITY)**

*Specially drawn by J F Campbell from gowns lent by Ede and Ravenscroft, London*

In the spring-loaded governor (Fig. 2) the bell-crank lever ABC is pivoted at the pin B, which is fixed to the frame F, the whole revolving with the shaft R. At the working speed, the leverage of the centrifugal force on the balls A, taken about B, is just balanced by the leverage of the spring pressure on the sleeve, also about B. If the speed increases, the centrifugal force increases, partly due to the increased speed and partly to the increased radius of the ball path. As the sleeve lifts, the compression of the spring increases until the increased load on the sleeve just balances the increased centrifugal force. The stiffness and initial compression of the spring can be so adjusted that a small change of speed will move the sleeve to its extreme limit in either direction. Such a governor is known as an isochronous governor and a dash-pot is necessary, introducing fluid friction to slow up the movement of the sleeve and prevent the valve over-shooting its correct position for the new load, causing hunting.

In the case of steam turbines driving alternating current generators, where the speed must be regulated within very fine limits and the stop valve is comparatively heavy, the governor is made to operate a relay, admitting oil under pressure to either side of a cylinder which moves the valve the required distance. Such a governor can be quite small and comparatively free from solid friction. Since the governor is nearly isochronous a dash-pot is usually fitted and an auxiliary spring is used for fine adjustment.

For compression ignition oil engines the governor either changes the position of a sleeve or rotates the plunger of the fuel pump, thus releasing the oil pressure in the fuel pipe earlier or later as required. In hydraulic turbines of the impulse type the governor operates a relay which deflects the jet of water issuing from the nozzle. In the reaction type the angle of the guide vanes at entry is altered by a similar device. (See Hydraulic Turbine.)

For correct reproduction of speech or music a gramophone disk must run at the prescribed speed without perceptible fluctuation. To ensure this a spring-controlled governor is fitted to the driving motor which increases or decreases frictional resistance as the speed tends to alter. In other cases the governor can be made to apply a brake to an epicyclic gear. See Gear.

**Governor** (Lat. *gubernare*, to steer). Representative in a province or colony of the supreme authority of a state. Under the Roman Empire civil officials with proconsular power and rank governed the senatorial provinces, i.e. those in which legions were not maintained; the imperial provinces, requiring military forces for their security, were governed by *legati Augusti*, with full military power and wide jurisdiction.

In the British Commonwealth, governors are classified as governors-general and governors. A governor-general is appointed by the crown to represent its authority in each of the dominions and in certain of the colonies. Other colonies (e.g. Gambia, the Bahamas) have governors.

In the U.S.A. each state elects a governor as the chief official in the legislative and executive management of its own affairs.

**Governor's Island.** Fortified island in New York Bay S. of the Battery. It lies at the entrance to the East R., and is separated from Brooklyn by the Buttermilk Channel. A station of the West India Company in 1621, the island is now the headquarters of the 2nd corps area or the eastern department of the U.S. army, which has jurisdiction over the area from New York to Virginia and includes Puerto Rico. By 1900, the island had dwindled from 170 to 70 acres through wave erosion. It was reclaimed in 1903 and now has an area of 173.35 acres. Bought from two Indians by Wouter van Twiller, second Dutch governor of New Amsterdam (as New York was formerly called) in 1637, the island has served at various times as a summer resort, racecourse site, sheep farm, and game preserve. It acquired its present name after the New York assembly in 1698 set it aside as a country seat for the colony's English governors. First fortified in 1794 when there were rumours of war with France, the island is the site of Fort Jay and Castle Williams, a circular fort used as a barracks, South Battery, overlooking the channel, the Chapel of S. Cornelius the Centurion, of Trinity Parish, a nine-hole golf course, polo grounds, target ranges, and the homes of the area commandant and of other army officers.

**Gow, NIEL** (1727-1807). Scottish violinist. Born at Inver, near Dunkeld, March 22, 1727, his skill in playing reels made him famous. In London he was in great request at fashionable gatherings, and he

also did most useful work in preserving old Scottish melodies. Gow, who died March 1, 1807, had four sons, all musicians, and his compositions are found in The Gow Collection of old Scottish songs, a valuable work containing many old melodies which would otherwise have been lost.

**Gowbarrow Park.** Estate in the Lake District of England, now public property. It is on the N. side of Ullswater, on the slopes of Gowbarrow Fell. The original park was about 2,000 acres in extent, but additions have been made to it. It contains a shooting lodge called Lyulph's Tower, and the beautiful waterfall of Aira Force. Gowbarrow was bought by the National Trust and opened in 1906.

**Gower.** Peninsula of Glamorganshire. It lies between the rivers Tawe and Loughor, being about 27 m. long and 7 m. across. It contains Swansea and Oystermouth, is almost surrounded by the waters of the Bristol Channel, and retains certain customs of its own. The Welsh call it Gwyr.

Gower was conquered by the Normans in the 12th century, and therein some of them settled, built castles, and introduced the feudal system. It had its own lord, who had the privileges of a lord of the marches; he held his court at Swansea and had his own sheriff and other officials. The lordship passed from the family of De Braose to John de Mowbray, duke of Norfolk. The earl of Pembroke was a later lord; from that family it passed to the Somersets, now represented by the duke of Beaufort. In 1535 Gower was included in Glamorganshire, to a co. constituency of which it gives its name.

**Gower, JOHN** (c. 1325-1408). English poet, contemporary and friend of Chaucer, who calls him "moral Gower." He lived

largely at his country seat in Kent, but details of his life are obscure. He became blind shortly before his death, and was buried in S. Saviour's Church at Southwark.



Niel Gow,  
Scottish violinist  
After Raeburn



John Gower,  
English poet



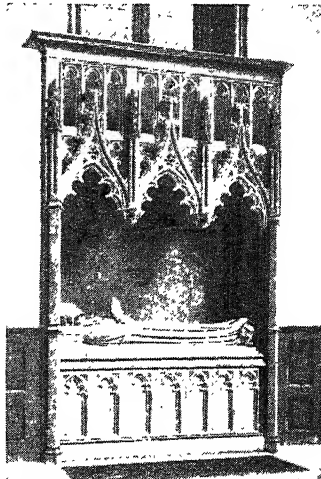
Gower's chief works are *Speculum Meditantis*, written in French, which was lost for centuries and discovered at Cambridge in 1895; *Vox Clamantis*, in Latin, which deals with the rising of Wat Tyler; and *Confessio Amantis*, in English, a collection of tales after the model of Chaucer's *Canterbury Tales*. Gower is unconscionably prolix and somewhat dull. The *Vox Clamantis*, which runs to 30,000 lines, is redeemed by the author's gift for story-telling and a certain quaintness of fancy. The standard edition of his works is that by G. C. Macaulay, 1899-1902.

**Gown.** Word meaning an outer garment of loose shape. It is now used in two senses, for the robe worn by graduate and undergraduate members of universities, and of learned societies generally, and as a synonym for a full-length dress worn by a lady. There are also dressing gowns, etc. *See Hood*; and plates facing pp. 3864-5.

**Gowrie, ALEXANDER GORE ARKWRIGHT HORE-RUTHVEN, 1ST EARL OF (1872-1955).** Born July 6, 1872, at Windsor, he was descended from the Scottish family of Ruthven who were earls of Gowrie, 1581-1600. He was educated at Eton, and commissioned to the Highland Light Infantry in 1891. Attached to the Egyptian army, he fought in the Sudan, and won the V.C. at Osmanieh, 1899. He served in France and Gallipoli, 1914-18, winning the D.S.O. and bar; he was made C.B., and retired in 1924 with the rank of brigadier-general. After terms as governor of S. Australia and of New South Wales he was governor-general of Australia, 1936-44. He was created a baron in 1935, an earl in 1944. In 1945 he was appointed deputy constable and lieutenant-governor of Windsor Castle, retiring in 1953. He died May 2, 1955.

**Gowrie Conspiracy, THE.** Plot against the person of James VI of Scotland, attempted by John, earl of Gowrie, and his brother Alexander, known as the master of Ruthven. On Aug. 5, 1600, the king was mounting his horse at Falkland Palace for a day's buck hunting when Alexander Ruthven approached and told him that a countryman had found near Perth a wide pot all full of coined gold in great pieces, and that the man was detained in Gowrie Castle, where the king was prayed to come and examine him.

About 7 o'clock the king accordingly rode there with a few attendants, Ruthven spurring forward to warn his brother of the king's approach. James's sus-



John Gowrie. Effigy and tomb of the poet in S. Saviour's Church, Southwark

picious had been aroused by Ruthven's strange manner, and also by Gowrie's appearance with an escort of fourscore armed retainers to meet his royal visitor, and he was further angered by the sorry cheer provided for his refreshment. After dinner Alexander led him to a remote part of the castle, up a winding stair, and through several rooms, the doors of which he locked behind him, into a gallery chamber where a man was waiting with a dagger in his girdle. Seizing this dagger, Ruthven held it to the king's breast, and threatened to stab him if he uttered a sound. James pleaded with him, and by promise of pardon and silence on the subject, prevailed on him not

to strike. Ruthven left the room to consult his brother, leaving the king in the custody of the servant.

Ruthven returning told the king he must die, and a desperate struggle followed, during which James managed to drag Ruthven to a window whence he called for help to his attendants, whom Gowrie had vainly tried to induce to leave, alleging that the king had already departed by another door. Sir John Ramsey was the first to find his way upstairs, and stabbed Ruthven, who was dispatched on the stairs by Sir Thomas Erskine and Sir Hugh Harries also rushing to the rescue. The earl of Gowrie, hurrying in, was stabbed to the heart by Ramsey.

What lay behind the facts remains uncertain. An investigation was held, but even at the time popular feeling ran high against James, whom the people believed to be "a doer and not a sufferer." It was alleged that he desired to extirpate the Ruthven family, who made some pretensions to the throne, and the pro- ed forgery of letters produced by a notary, George Sprot, which purported to have been written by Sir Robert Logan of Restalrig to Gowrie, has strengthened this opinion, further confirmed by the ruthless treatment meted out to the surviving Ruthvens. On the other hand, it has been suggested that the Ruthvens were actuated by desire to avenge their father's execution, and also that the conspiracy originated in the English court with the connivance of Elizabeth. *See The Tragedy of Gowrie House, L. A. Barbé, 1887; James VI and the Gowrie Mystery, Andrew Lang, 1902.*



Gowrie Conspiracy. The death of John and Alexander Gowrie, frustrated in their plot to assassinate James VI of Scotland

From a print in the British Museum

**Goyanna** or GOJANA. Town of Brazil, in the state of Pernambuco. It stands on the river Goyanna, 40 m. N.N.W. of Pernambuco. It possesses a Carmelite monastery, schools, a hospital, law courts, and factories, and it trades in cotton, dyewoods, sugar, rum, coffee, tobacco, cattle, and hides.

**Goya y Lucientes**, FRANCISCO JOSÉ DE (1746–1828). Spanish painter and etcher. Born of peasant



Francisco Goya y Lucientes, Spanish painter  
Self-portrait

parents at Fuendetodos, in Aragon, he studied art under José Martínez at Saragossa. Having become embroiled with the authorities, he was obliged to flee to Madrid, and a few years later had to seek refuge in Italy. Returning to Madrid in 1775, he married the sister of Bayeu, the court painter, through whose interest he was commissioned to design the famous tapestries now in the Prado. In 1785 he became deputy director of the San Fernando Academy, in 1789 painter of the chamber to Charles IV, and in 1814 court painter to King Ferdinand. He was in Seville, 1817, at Paris, 1824, and at Bordeaux, 1825, where he died April 16, 1828.

A revolutionary in life as well as in art, Goya delighted in offending conventional susceptibilities. His three most famous sets of etchings, *Los Caprichos*, the *Tauromaquia*, and *Los Desastres de la Guerra*—the last inspired by Napoleon's invasion—express his mordantly satirical genius almost better than any of his paintings; but his portraits and subject paintings, with their uncompromising realism, are hardly less characteristic. The best of his work is at Madrid, but there are four examples in the National Gallery, London. Consult Goya: an Impression of Spain, Lord Derwent, 1930; Goya, C. Poore, 1938.

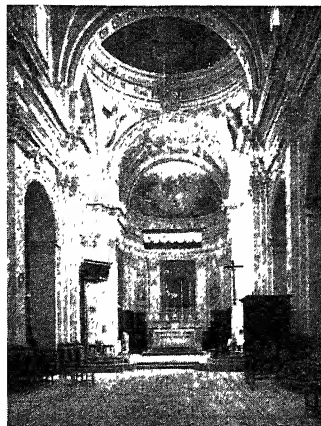
**Goyaz**. Central state of Brazil. It is bounded on the W. by Matto Grosso, and on the E. by Minas Geraes and Bahia. Area, 288,462 sq. m. Several mt. ranges traverse the state, mostly running from N. to S. and of no great elevation. The principal rivers are the Tocantins, which rises as the Maranhão in the S. of the state and flows due N. through the centre; the Araguaia on the W. boundary; and the Paranaíba. Several other streams are unnavigable because

of cataracts and currents. Extensive forests fringe most of the rivers, and a large portion of territory in the northern districts of the state is unexplored.

The S. part of the state contains the principal centres of the civilized population. Formerly gold was extensively worked, but the output has declined considerably. Silver, copper, marble, and iron exist, but are unworked. Diamonds and quartz crystals, called Brazilian pebbles and used in optical work, are found. The chief occupation is stock-raising, but the cultivation of coffee, sugar, tobacco, and cacao is carried on. Goyaz is the most backward of the Brazilian states, transport facilities are almost non-existent, and rlys. are only just beginning to be laid down. The site for the Federal capital has been selected from this state, on a plateau between Formosa Pyrinopolis and Santa Lugia. The climate is agreeable on the whole. Pop. (est.) 907,800.

Joyania (*q.v.*), the capital of the state, was formerly known as Goyaz or Villa Boa de Goyaz.

**Goyen**, JAN VAN (1596–1665). Dutch painter. Born at Leiden, Jan. 13, 1596, he worked for a while in France, and on his return to Holland took finishing lessons from Esaias van de Velde. After a short sojourn in Haarlem he resided in his native city for several



years, removing in 1631 to The Hague, where he died in April, 1665. He painted the river, canal, and coastal scenery of the Netherlands.

**Gozo** or Gozzo. British island of the Maltese group. It lies 4 m. N.W. of Malta, is 8 m. long and 4 m. broad, and has an area of 26 sq. m. Composed of coralline limestone, the surface is diversified, fertile, and well cultivated, producing fruits and vegetables. Lace is

made. There are remains of cyclopean walls, and a tower and Roman monuments. The chief towns are Victoria, formerly Rabato, in the centre of the island, and Fort Chambray on the S.E. coast. Pop. 23,000.

**Gozzi**, CARLO, COUNT (1720–1806). Italian dramatist and memoir writer. He was a native of Venice, born Dec. 13, 1720, and dying there April 4, 1806. His farcical plays and fairy pieces in the Venetian patois enjoyed popularity for their satiric wit. They were written to ridicule his dramatic rivals, Carlo Goldoni and others, and their success contributed to drive Goldoni from Venice. Re Turandote was the basis of an opera by Puccini. Gozzi's Memoirs, 1797, were translated into English by J. A. Symonds, 1890.

**Gozzoli**, BENOZZO (1420–c.1498). Florentine painter whose real name was Benozzo di Lese. Born in Florence, he studied under Fra Angelico, whose assistant he afterwards became. Gozzoli, who was an industrious and painstaking fresco painter, betrays the influence of Fra Angelico in his early works. Among his famous works were a Virgin and Child and St. Thomas Receiving the Girdle from the Virgin, painted in 1459 for the church of San Fortunato at Montefalco (the latter now in the Lateran Museum, Rome); the decorations for the Riccardi (then the Medici) Palace in Florence, particularly the frescoes of The Journey of the Three Magi and Angels in Paradise; and the series of 24 frescoes of Biblical themes executed for the Campo Santo, Pisa (ruined by shell fire, July 27, 1944). The National Gallery, London, contains his Virgin and Child with



Gozo, Malta. Wall in the Gran Castello containing Norman archways. Top, left, interior of the cathedral looking eastward



Gozzoli. This Florentine artist's spirited and highly Italianate conception of the abduction of Helen of Troy  
National Gallery, London

Saints, painted at Florence, 1461, and a rendering of Paris stealing Helen of Troy from her husband's house. Gozzoli died at Pistoja, Oct. 4, 1497 or 1498. *Pron.* Got-so-lee.

**Graaf Reinet.** Town of Cape Province, South Africa. It stands on the Sundays river, 185 m. by rly. N.N.W. of Port Elizabeth. Founded in 1784, it is situated in a district famous for its angora goats and ostriches. To the N. are the Sneeuwbergen, of which the Compassberg rises to a height of 8,200 ft. above sea level. The town, which possesses a teachers' training college, and is noted for its fruit and wine, was founded in 1786. Pop. (1951) 14,098, of whom 4,918 were white.

**Graben** (Ger., grave). In geology a valley or depression produced by faulting. It is an alternative term for rift-valley (*q.v.*).

**Gracchus.** Name of two reformers in ancient Rome. They were the sons of Cornelia (*q.v.*), daughter of Scipio Africanus the Elder, by Tiberius Sempronius Gracchus, governor of higher Spain in 181 B.C., who made the province one of the most peaceable in the Roman dominions.

The elder, Tiberius Sempronius Gracchus (163–133 B.C.), was present at the siege of Carthage and served in Spain, and on his journeys to and from that country the deplorable condition of Italian agriculture first drew his attention. The public land, *i.e.* the conquered territory distributed among Ro-

man citizens, had largely and illegally passed into the hands of a comparatively small number of wealthy people, who cultivated their farms chiefly by slaves.

As tribune in 133, Tiberius brought forward a measure providing that the public lands should be distributed in small holdings among the poor, and that a certain proportion of free labourers should be employed on all large farms. This measure brought Tiberius into conflict with the senate and the wealthy; and another tribune, Octavius, was suborned to veto the proposed legislation.

Tiberius thereupon got the assembly of the people to deprive Octavius of his office, and the bill was passed. Threatened with impeachment at the end of his term of office for his illegal proceedings, Tiberius set himself to obtain the tribunate for another year. The elections were held, but the senate declared that they were illegal, and in the riots which ensued Tiberius and 300 of his followers were killed. Tiberius was a man of noble character, and his reforms were prompted by a genuine desire to improve the condition of his less fortunate fellow citizens. Nor was his work altogether in vain; much land was recovered, and during the next decade the census showed an increase of 70,000 citizens.

Ten years after the death of Tiberius, the agitation was renewed by his brother, Gaius Sempronius Gracchus (153–121 B.C.), who, after service in Spain and as quaestor

in Sardinia, was tribune in 123 and 122 B.C. His policy was to put his reforms on a much broader basis than that of his brother, and not to rely on the support of only one class in the community.

In addition to renewing the purely agrarian legislation of Tiberius, his measures included the establishment of colonies for settlement by the poor, army reforms, and a monthly dole of corn to all citizens at less than half the market price, while an endeavour was made to secure the support of capitalists of the equestrian order by giving them the privilege of acting as jurymen. These proposals met with opposition from the senate, which Gracchus sought to counter by reviving the constitutional legislative powers of the assembly of the people which had been usurped by the senate. His policy virtually amounted to a revolution, and the senate, thoroughly alarmed, put forward a tribune, M. Livius Drusus, to outbid Gracchus. An additional proposal of Gracchus to extend the franchise among the Italians alienated many of his purely Roman supporters. He was not elected for the tribunate of 121, and steps were taken by the senate to repeal his measures. The result was a riot, in which Gracchus perished, as his brother had done before him. Less disinterested, perhaps, than Tiberius, Gaius was undoubtedly the abler man. The democratic movement which he started was eventually the chief instrument in the overthrow of the senatorial ascendancy. The lives of the brothers were written by Plutarch. *See Agrarian Laws.*

**Grace** (Lat. *gratia*). Term used in theology to express the love of God manifesting itself in free and undeserved favour to mankind. This manifestation is threefold and progressive. First, there is the original and eternal love with which God views His creatures; hence He wills that all men shall be saved and sends forth His Son to accomplish that salvation by His death. This is the grace of undeserved favour. Secondly, this fact is brought to the knowledge of man by the preaching of Christ and His Apostles, and by the teaching of the Christian Church. This is the grace of outward instruction. Thirdly, the knowledge of salvation is made effectual in the soul and the life by the supernatural gift of the Holy Spirit, whereby man embraces the salvation freely provided and offered him. This is the grace of inward sanctification.

The first is often known as general grace, and the second and third combined as particular grace.

Persons are said to be in a state of grace when they are living in communion with God, are penitent for their sins, and are making use of the means of grace provided by Christ. The sacraments are the special channels of divine grace; but whether their efficacy depends on the faith of the recipient is one of the points of controversy between Catholics and Protestants. In regard to the relationship of the grace of God to the free will of man, S. Augustine and the Calvinists maintained that all good in man is due to the grace of God; while the Pelagians taught that grace merely guided and helped man's free will. The Church generally takes the view that the grace of God and the free will of man cooperate in all good works; though some hold that every good thing wrought by the will of man is due to the preventer or anticipatory grace of God. *See* Calvinism; Theology.

**Grace** (Lat. *gratia*). Word meaning a favour of some kind. It is thus used in law and politics. In England an Act of Grace is one passed at the opening of a new reign, granting a general pardon to certain classes of offenders, usually insolvent debtors. In Scotland the term is applied especially to an Act of 1696, which compelled every creditor who had caused a debtor to be imprisoned for debt, to be responsible for the debtor's maintenance while in prison. Favours granted by sovereigns were long known as graces, and the term survives at the universities, being used there for certain permissions, *e.g.* to take a degree. Days of grace are days allowed, beyond the appointed time, in which a bill of exchange must be met. The phrase Your Grace is used in Britain in addressing archbishops and dukes, the idea behind it being that persons of these high ranks granted favours.

**Grace.** Form of thanksgiving said or sung before or after meals. Something of the kind was in use among the Greeks and Romans, but the existing graces are of Christian, and mainly monastic, origin. They are said in the halls of public schools and colleges, at Oxford and Cambridge, the Inns of Court, and other learned societies, and frequently at public dinners. Some societies have their own graces, often a long one. A popular form is *Benedictus benedict* (May the Blessed bless) used

before, and *Benedicto benedicatur* (May the blessed be blest) used after the meal.

**Grace, HARVEY** (1874-1944). A British organist and music critic. Born at Romsey, Jan. 23, 1874, he became a pupil of Madeley Richardson at Southwark cathedral, and organist at S. Mary Magdalene, Munster Sq., London. He directed the S. Cecilia festivals, 1925-33, and was organist and director of the choir at Chichester cathedral, 1931-38. Editor of *The Musical Times*, 1918-44, in which his regular comments on current musical affairs over the signature Feste commanded attention, he also wrote manuals for organists, transcribed Bach, and edited Rheinberger's sonatas. He died Feb. 15, 1944.

**Grace, WILLIAM GILBERT** (1848-1915). English cricketer. Born July 18, 1848, at Downend, Glos, he was the son of a doctor, who was also an enthusiastic cricketer. W. G. had three brothers, of whom Edward Mills (1841-1911) and George Frederick (1850-80) also played cricket for Gloucestershire and England. W. G. became a doctor, but cricket was his real career.



W. G. Grace  
Russell

In 1863 he began to play in first-class matches, and in 1870 became a member of the Gloucestershire team, which almost at once ranked as first-class. This he captained until 1899, and under him it was thrice champion county. Grace also captained the English team in test matches against Australia until 1899, and to that country he took teams in 1873-74 and 1891-92; he also visited the U.S.A. In 1899 he became manager of the new London county club. He died Oct. 23, 1915.

The Champion, the Doctor, the Old Man, or W. G., as he was variously called, was certainly the greatest cricketer who ever lived. Of massive frame, over 6 ft. in height, he was also devoted to other sports, being a fine runner. As a batsman he was superb, but he was also a notable fieldsman and a skilful bowler. He knew the game from end to end, and was as crafty as he was brilliant. Grace's performances with the

bat were the more marvellous because they were done on the rougher wickets of the past. By 1900, when his career as a first-class cricketer ended, he had scored over 54,000 runs. In 1871 he scored 2,739 at an average of 78. In 1895, aged 46, he made 1,000 in May. His tally of 126 centuries was not beaten until 1925, by J. B. Hobbs. His highest score in first-class cricket was 344, and on ten occasions he passed 200. As a bowler he took over 2,800 wickets, while in seven seasons he scored over 1,000 runs and took over 100 wickets. He played in a series of Gentlemen v. Players matches from 1865 to 1899. Grace wrote *Cricketing Reminiscences*, 1899. *Consult* Life. B. Darwin, 1934.

**Grace and Favour Residence.** In the U.K., a residence belonging to the sovereign and lent to a subject free in recognition of service rendered either by the subject or a deceased relative of the subject.

**Gracechurch Street.** London thoroughfare connecting Fish Street Hill with Cornhill and Leadonhall Street, E.C. It was known in the 13th century as *Garscherchesstrate* (A.S. *gaers, gers, graes*, a blade of grass, herb, hay), from the grass or herb market held in the yard of S. Benet's church; the form Gracechurch was used from 1666. S. Benet's was burnt in the Great Fire, rebuilt by Wren 1685, and demolished 1867-68, when the street was widened. Tarlton the clown lived here, and at the Cross Keys Inn, No. 15, which existed down to the middle of the 19th century, Banks exhibited his horse Marocco.

**Grace Note.** In music, a note not essential to the harmony, added to give piquancy to melodies. Such notes are usually written smaller than the ordinary notes. *See* Appoggiatura; Mor dent; Shake; Trill; Turn.



**Graces.** In classical mythology, the three deities of grace and beauty, originally goddesses of fertility, and called Charites by the Greeks and Gratiae by the Romans. *See* Charites.

**Grackle** or **GRACKLE** (Lat. *graculus*, jackdaw). Name given to a number of birds of different regions, *e.g.* the hill mina of Malaya and India. These birds belong to the starling family, and have glossy black plumage with yellow wattles on the sides of the

head. They live entirely on fruit, and are clever talkers and mimics.

**Grader.** Machine for shaping the surface of roads, airfields, and similar areas. It consists of a scraping and carrying blade somewhat like that of a bulldozer (*q.v.*); the type of bulldozer termed an angledozer is a form of grader. The heavy steel blade is adjustable at various angles in relation to the line of forward travel, and when the grader is towed, or moved by its own built-in motive unit, the soil of the road is scraped off and carried to one side of the track. The grader is adapted for shallow excavation of loose soil, the removal of sods, the shaping of road surfaces to a slope or a camber, etc. It can also be used for mixing and placing new material on top of the road bed. Besides the adjustment for angle of blade in relation to line of travel, the blade can be set at various angles. See Excavator.

**Gradient** (Lat. *gradus*, a step). Term applied to the degree of ascent or descent of the slope of a road or rly. from the horizontal. A gradient is measured as one part vertical rise in  $x$  parts of horizontal distance, and may be denoted in several ways. Thus a gradient of two degrees 52 minutes is equal to a gradient of 5 p.c. or of 1 in 20; the way rises 1 ft. vertically in every 20 ft. horizontally.

The ruling gradient is the greatest slope permitted on a road or rly. On high roads this is usually kept between 1 in 20 and 1 in 30 except for short distances. A gradient of 1 in 25, occasionally used on rlys. in mountainous districts, is generally regarded as the limit for locomotives which depend upon friction for their driving force.

In Great Britain, gradients are always measured by the ratio 1 in  $x$ . This has the advantage of giving the relation between the weight of a vehicle and the tractive effort which is always exerted in a direction parallel with the road; thus a vehicle weighing 4 tons requires a tractive effort of one ton when ascending a gradient of 1 in 4. In the U.S.A., gradients are expressed by a percentage; an incline which rises 1 ft. in 10 ft. is a ten per cent. grade. A 66 p.c. gradient is the steepest which a vehicle can climb; above that figure the force of gravity overcomes the tractive effort.

The gradient of a river or flow of water is known as its fall. In physics the term gradient is used

to denote the rate of change of any quantity with distance. Pressure gradient is a term employed in meteorology to denote the rate of change of barometric pressure with distance along the earth's surface measured perpendicularly to the isobars. Potential gradient is an electrical term denoting the space-rate of change of electrical pressure or voltage across a medium such as a gas, liquid, or a solid dielectric.

**Gradual** or **GRAYL** (Lat. *gradus*, a step). Ancient liturgical chant or antiphon. Also called the responsory, it is sung at High Mass after the reading of the Epistle. Called the gradual from being formerly sung on the altar steps or while the deacon ascended the steps of the ambo (*q.v.*) or reading desk to sing or read the Gospel, it is called the responsory because it answers the Epistle. It is followed by the Hallelujah or, in penitential seasons, by the Tract. The book containing these pieces of music, to which Haydn, Mozart, and Cherubini contributed, was known as the Gradale or Graduale, a term later extended to include other portions of the service.

**Gradual Psalms.** Title given to Psalms 120-134. The early Fathers regarded them as marking the steps by which the soul ascends to God. In the Roman Breviary they are divided into three sets of five each, formerly said before matins every day in Lent. The obligation of reciting them in choir was abolished by Pius X. The term Song of Degrees, applied in the A.V. to a number of these Psalms, is altered in the R.V. to Song of Ascents. Of the many theories of the title the most generally accepted is the explanation that these Psalms were sung during the "goings up" or pilgrimages of the Jews to Jerusalem for the great annual feasts. They are usually attributed to the early part of the post-exilic period.

**Gräfe, KARL FERDINAND VON** (1787-1840). A German surgeon. Born March 8, 1787, at Warsaw, he studied medicine at Halle and Leipzig, and in 1810 founded and directed a surgical clinic at Berlin. Superintendent of German military hospitals during the Napoleonic wars, he did much to reform army hospitals and improve the treatment of wounds; but he is chiefly remembered as the father of plastic surgery. Gräfe died at Hanover, July 4, 1840.

**Graffiti** (It. *graffiare*, to scratch, to engrave unskillfully). Term used

for ancient scribbings. Written or drawn upon walls, rocks, potsherds, and other surfaces, graffiti were scratched with sharp implements, drawn in charcoal or chalks, or painted. Universal in range, from Palaeolithic drawings in the Sahara Desert to scratchings by 2nd-century Chinese pilgrims on Shantung tombs, and viking runes at Maeshowe, they survive in the schoolboy, tourist, and other scrawls from which few historic monuments are free. In ancient Egypt graffiti of all periods are found on the walls of tombs and temples; many thousands are recorded from Thebes. At Pompeii they included sporting tips, election notices, and amatory effusions. On Silchester potsherds they show the Romano-British populace habitually using Latin. They were numerous in ancient Rome; a caricature of the Crucifixion was found on the Palatine in Rome in 1857; Marucchi found in the S. Sebastian catacomb, in 1915, 4th-century graffiti confirming its traditional association with the remains of SS. Peter and Paul.

**Graf Spee.** This German pocket battleship of the Second Great War is described under its full title Admiral Graf Spee. See also Plate, Battle of the.

**Grafting.** A method of transferring a branch or bud of a choice variety of tree to a foster-parent. This process depends for its success on the union of the cambium layer (the seat of active growth which lies just beneath the bark) of the scion or graft with that of the stock. The scion is a piece taken from the tree it is desired to increase, and the stock is the tree on which it is placed. Grafting is carried out when the sap is rising, from the end of March to the end of April.

The scion is a portion of a sound, firm shoot containing buds of the previous year's growth. It may be 6-10 ins. in length and should be prepared for insertion on the stock with a sloping cut at the base. As scions must be in a less advanced state of growth than stocks, they are cut off the trees in winter and half buried in a shady border. Selection and planting of special stocks are best left to the commercial grower, but amateurs will find grafting useful for renovating old apple and pear trees.

The branches of the old tree are cut back in Jan. to within about 18 ins. of the base. Crown or rind grafting is most suitable for large branches; it is carried out by inserting two scions on each

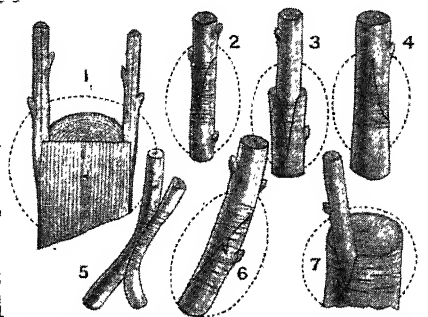
branch. A slit about 2 ins. deep is made in the bark, which is then lightly prised away from the branch to allow of the scion being inserted immediately behind it to such a depth that the top of the sloping cut on the scion is level with the top of the shortened branch. The scions are tied firmly with raffia or soft string, and this is covered with grafting wax or clay.

When the stocks are small, whip or tongue grafting is practised. Sloping cuts are made on scion and stock; the former is placed on the latter and bound and covered as already described. A firmer junction is assured by making a slit on the stock and another on the scion so that the tongue thus formed on the latter will fit into the notch on the stock.

**Grafting.** In surgery, transference of tissue from one area to another to replace structures destroyed by burn or injury. Skin grafting was introduced by Reverdin in 1869. His plan was to remove a number of small pieces of cuticle and cutis, the upper layers of the skin, from the healthy area, which were then dotted over the denuded area, thus serving as centres of repair. In Thiersch's method large strips of cuticle are applied to the raw surface. In the Wolfe graft the whole thickness of the skin is employed. Between the graft and the surface penicillin is now inserted, combating effectively the sepsis which once caused the failure of many operations. Bone-grafting has important uses in modern surgery.

**Grafton.** Town of New South Wales. It stands on the Clarence river, 45 m. from its mouth, and 434 m. N. of Sydney. It has bacon factories, creameries, sawmills, and tanneries, and is the centre of a fertile district devoted to dairying and horse breeding, and producing sugar, maize, oranges, and timber. It is the seat of Anglican and Roman Catholic bishoprics. Electric power is supplied to the town by the Nymboida hydro-electric scheme. Pop., with South Grafton, (1954) 14,201.

**Grafton, DUKE OF.** English title borne by the family of FitzRoy from 1675. Henry, son of Charles II by Barbara Villiers, duchess of Cleveland, was called FitzRoy and made duke of Grafton in 1675. He



Grafting. 1. Crown or rind grafting. 2. Splice. 3. Cleft. 4. Saddle. 5. Inarching. 6. Whip. 7. Notch

was killed in 1690 whilst fighting in Ireland for William of Orange. His descendant, Augustus Henry, the 3rd duke, figured in the politics of the 18th century, and from him the later dukes descend. Charles Alfred Euston FitzRoy (b. 1892) became 10th duke in 1936 in succession to a cousin. The duke's eldest son is known as earl of Euston, and his chief seat is Euston Hall, Thetford. His estates are in Suffolk and Northants.

**Grafton, AUGUSTUS HENRY FITZROY, 3RD DUKE OF (1735-1811).** English statesman. Born Oct. 1, 1735, he was educated at Westminster and Cambridge. He became duke in 1757 and was soon a prominent figure in politics. He opposed Bute, and in 1765 became secretary of state for the northern department. In 1766 he was made first lord of the treasury. He was head of the ministry during Pitt's illness, but resigned in 1770. He was made lord privy seal in 1771, and again in 1782. Grafton seldom let public affairs interfere with racing and other pleasures. He died March 14, 1811.

**Graf Zeppelin.** Name of two German airships and an aircraft carrier. The first airship (L.Z.127) was the most successful of all commercial lighter-than-air craft. Launched in 1928, it was 772 ft. long, 100 ft. in diam., and had a gas capacity of 3,710,000 cu. ft. The five engines (530 h.p. each) drove the ship at 80 m.p.h. Commissioned under Dr. Hugo Eckener (q.v.), the Graf Zeppelin made the first round-the-world flight (1929) and a visit to the North Pole (1931), but during 1932-36 was on a regular service from Ger-

many to S. America, making 148 Atlantic crossings without incident. It had carried over 13,000 passengers and covered a million miles when withdrawn from service.

A much larger Graf Zeppelin (L.Z. 130) was launched in 1938, as a sister ship to the ill-fated Hindenburg (q.v.), but the outbreak of war prevented its commercial use. The 19,250-ton aircraft carrier Graf Zeppelin—Germany's first modern carrier—was launched in 1938, but never completed. See Airship; Zeppelin.

**Gragnano.** Town of Italy, in the prov. of Naples. It is 20 m. S.E. of Naples, and has macaroni factories and exports red wine. Pop. (1951) 19,985.

**Graham, SIR JAMES ROBERT GEORGE (1792-1861).** A British politician. He was born June 1, 1792, and went to Westminster School and Christ Church, Oxford. Entering parliament as a Whig in 1818, he made his mark as a Liberal with a pamphlet, *Corn and Currency*, 1826, and was first lord of the admiralty in Grey's reforming administration, 1830-34. Graham then moved to the Right, resigning over Irish Church policy. Home secretary under Peel, 1841-46, he became unpopular for having private letters opened by the post office. He went out of office with Peel, succeeded him as party leader, and was again at the admiralty in Aberdeen's coalition, but resigned in 1855 when a committee was set up to discuss the conduct of his department in the Crimean War. He died Oct. 25, 1861. Consult Life, C. S. Parker, 1907; The Public Career of Sir J. G., A. B. Erickson, 1952.

**Graham, ROBERT BONTINE CUNNINGHAME (1852-1936).** Scottish author and traveller. His an-



Sir James Graham, British politician



Augustus H. FitzRoy, 3rd Duke of Grafton



R. B. Cunningham Graham, Scottish author

cestry was partly Spanish and he also claimed to be the heir of Robert II of Scotland. From Harrow School he went to S. America and was by turns a soldier in Uruguay, a rancher in Argentina, and a farmer in Mexico, where he



met Buffalo Bill. As Radical M.P. for N. Lanarkshire, 1886-92, he had a stormy career, being suspended twice and injured in the Trafalgar Square riots of Nov. 13, 1887, sometimes called "bloody Sunday." In the First Great War he bought horses and cattle in S. America for the British government. He died March 20, 1936, in S. America. In 1879 he had married a Chilean, Gabriela de la Balmondière, artist and writer.

Graham's Notes on the District of Menteith, 1895, made a remarkable guide book. Next year, with his wife, he wrote Father Abraham of Scotland and other essays. Aurora, la Cujíñi, 1898, sketched a bull fight and dance hall in Seville. In the same year Mogreb el Acksa described a Moroccan journey. A Vanished Arcadia, 1901, concerned Paraguay. Graham wrote lives of many S. American figures, e.g. de Soto, Diaz del Castillo, Valdivia, Paez; and romantic works entitled Success; Progress; Faith; Hope; Charity. Lavery painted him as Don Quixote and he is described in A Modern Conquistador, H. F. West, 1932.

**Graham, STEPHEN** (b. 1884). British author and traveller. Study of Russian literature attracted him to visit the country, where he tramped in the Caucasus, Crimea, and Far North, as well as Central Asia. Returning through Egypt, the Balkans, Norway, and Murmansk, 1914-16, he joined the Scots Guards in the First Great War, and wrote of his experiences in A Private in the Guards, 1919. In the 1920s he was exploring, mostly on foot, the new Russia and the Balkans. Beginning with A Vagabond in the Caucasus, 1911, he wrote a series of travel books, social studies, and biographies of tsars—Peter the Great, Ivan the Terrible, Boris Godunov. With these were interspersed studies like London Nights, 1925; The Gentle Art of Tramping, 1927; Twice Round the London Clock, 1933. Graham edited The Tramp's Anthology, 1928.

**Graham, THOMAS** (1805-69). British chemist. A Glasgow boy, born Dec. 21, 1805, he attended



*The Graham* staying until

he became master of the mint in 1855. F.R.S. from 1836, he was a founder and first president of the Chemical Society, 1841. He died Sept. 11, 1869. His investigations into the diffusion of gases and liquids led to the concept of polybasic acids.

**Graham, WILLIAM** (1887-1932). A British politician. Born at Peebles, July 29, 1887, he went to George Heriot's School, studied economics and law at Edinburgh University, and became a journalist. A prominent Labour leader, he lectured at Ruskin College, Oxford, became a member of the Edinburgh town council in 1913, and was M.P. for Central Edinburgh 1918-31. In the first Labour govt., 1924, he was financial secretary to the Treasury; in the second, 1929-31, president of the board of Trade. He died Jan. 8, 1932.

**Grahame, KENNETH** (1859-1932). British banker who earned fame by his stories for children. The son of an advocate, he was born in Edinburgh on March 8, 1859, and educated at St. Edward's School, Oxford. He entered the Bank of England, of which he was secretary 1898-1908. A first work, The Headswoman, a short satirical tale, appeared in 1890. In 1895 The Golden Age, consisting of 18 sketches, won acceptance as a classic description of childhood. More famous was The Wind in the Willows, 1908—a story of animals written for children—dramatised by A. A. Milne in 1930 under the title of Toad of Toad Hall. Grahame died at Pangbourne, July 6, 1932. His Life and Letters by Chalmers appeared the following year.

**Grahame-White, CLAUDE** (b. 1879). First British aviator. Born Aug. 21, 1879, he was educated at Bedford grammar school and established a motor engineering business in London. He became interested in aeronautics in 1909, making his earliest flights at Pau, and was the first Englishman to be granted an aviator's certificate. There he started the first British flying school. Grahame-White made a gallant attempt to beat the Frenchman Paulhan in his flight from London to Manchester in a bid to win the Daily Mail's £10,000 prize. Paulhan reached

Manchester early on April 28, 1910, just ahead of Grahame-White, who had made the first night flight in history. In the U.S.A., also in 1910, the latter won the second Gordon Bennett race at 60 m.p.h. He formed the Grahame-White Aviation Co., which became proprietors of the aerodrome at Hendon. Popular flying displays were organized, and aircraft were built in his factories during the First Great War.

**Grahamite.** An asphaltite, the more lustrous varieties of which may be confused with gilsonite (*q.v.*), but it is differentiated from that mineral by a higher fixed carbon content (30 p.c.) and by not melting but intumescing when heated. Grahamite occurs in veins, exceptionally exceeding 30 ft. in thickness, and is found in W. Virginia, Oklahoma, Trinidad, Cuba, Argentina, Peru, etc. The ash of some grahamites contains a high proportion of vanadium.

**Graham Land.** Part of the Antarctic continent. It lies due S. of Tierra del Fuego, N. of Alexander I Land, and S. of Danco Land, and is a dependency of the Falkland Islands. It was discovered by John Biscoe, a British mariner, in 1832, the islands lying off its N. coast being named after him. It is a mountainous tract, desolate and ice-bound. Nordenskiöld remained two years here from 1901, and it was visited by Charcot in 1904-05. On the W. coast a meteorological station was erected by the Argentine republic. Ry-mill's 1934 expedition showed that Graham Land is not an archipelago but part of the continent. See Antarctic Exploration.

**Graham Prize.** Prize for naval history, founded in 1909 by Lady Graham in memory of her husband Admiral Sir W. Graham. It is given to the cadet of the 4th, 5th, or 6th term at the Royal Naval College, Dartmouth, who obtains highest place in a voluntary examination in a special period of naval history.

**Grahamstown.** City of South Africa. In the Cape prov., it is the capital of its E. portion, in the Albany district. Grahamstown stands on the slopes of the Zuurburg Mts., by rail 43 m. from the sea at Port Alfred and 106 m. N.E. of Port Elizabeth. The chief buildings are the Anglican and R.C. cathedrals, and the city hall, a Gothic building completed in 1882; there are a public library, art gallery, and museum. The Anglican cathedral in Church Square, partly designed by Sir Gilbert



C. Grahame-White, British aviator

Scott, has interesting decorations. There are several other churches, a synagogue, etc. The Albany Hall, the court house, and the botanic gardens covering 100 acres may be mentioned. At Grahams-town is the Settlers' Hospital. Educational institutions include



Grahamstown. The 1820 Settlers' memorial, the cathedral, and, on the left, the City Hall

the Rhodes university college, founded in 1904; and S. Andrew's College, a public school for boys.

Oatlands is a suburb, and near the town is a racecourse. Grahams-town has a trade in wool, and is also a health resort. Founded in 1812, it was for many years an important military station. It was named after Col. John Graham, a leader among the early settlers. European pop. (1946) 8,900.

**Grahn, LUCILE** (1819-1907). Danish dancer. She trained at the Royal Theatre ballet school, Copenhagen, making her début there in 1829, and became a pupil of Bourmonville. She appeared as a ballerina in Paris in 1836, and was soon acclaimed one of the finest dancers of her time. Grahn achieved a European reputation and outstanding success in romantic ballets. She later taught and produced ballet at Munich, retiring in 1875.

**Graian Alps.** Section of the Western Alps, lying between S.E. France and N.W. Italy. Running from N. to S. from the valleys of the Isère and Dora Baltea in the N. to those of the Arc and Dora Riparia in the S., they culminate in the Gran Paradiso (13,324 ft.) and the Grivola (13,022 ft.).

**Grail, THE HOLY.** Name given in legend to the cup used by Christ at the Last Supper. Several versions of the story of this vessel exist, some saying that it came

into the hands of Joseph of Arimathea, who used it to collect the Blood which flowed from Christ on the Cross. By other authorities it is described as the sacred cup from which Christ drank while hanging on the Cross. It is sometimes called the San (Saint) Graal or Greal. Joseph is reported to have brought it to England, but later it is said to have been carried to India.

In the *Morte d'Arthur* of Sir Thomas Malory (15th century), the Siege (seat) Perilous at the Round Table is reserved for the perfect sinless knight who shall achieve the quest of the Grail; and there on the day on which that knight, Galahad, who was of king's lineage and of the kindred of Joseph of Arimathea, takes his seat it is told to Arthur: "This day the San Grail appeared in thy house, and fed thee and all thy fellowship of the Round Table." After the Holy Grail has appeared, the knights set off on that quest which but one can achieve, and which marks the breaking up of the fellowship.

In another form of the legend—that of which Perceval (*q.v.*) is the central figure—the Grail is seen in a chapel belonging to the castle of King Fisher, and evil falls upon the king and his land because the knights to whom a sight of it is granted fail to say a certain word. In the Germanised form of the story, the Grail is not a dish or a cup, but a stone; while in the Welsh tale of *Peredur*, which some regard as the original, there is no Grail at all, but only the quest.

In the 12th century Robert de Borron treated the subject in his *Joseph of Arimathea*. About the same time Chrétien de Troyes wrote his poem, *Perceval le Gallois*, and about the end of the century came another version in the *Parzival* of Wolfram von Eschenbach, who said that he had received the substance of his story from a Provençal poet. In the early part of the 13th century an unknown author composed the romance of *Perceval le Gallois*, ou *le Conte de Graal* (Eng. trans. The High History of the Holy Grail, S. Evans, 1898). The etymology of the word grail (old Fr. *grail*, *greal*) is uncertain. It is suggested that it is a corruption of late Lat. *gradale* or *cratus* (*cf.* crater), both meaning bowl, dish. San Gréal was later corrupted into Sang Réal, the True Blood of Christ. See *Arthur*; *Morte d'Arthur*; consult also *The Legend of the Holy Grail*, A. Nutt, 1902.

**Grain** (Lat. *granum*). Literally a small, hard seed. From this it has become a synonym for corn, especially when used in a business sense. See *Barley*; *Oats*; *Wheat*.

**Grain.** Unit of weight. The average weight of a grain of corn taken from the middle of a ripe ear: the 1/7000 part of a pound avoirdupois. In Troy weight, 480 grains equal an ounce, while 24 grains are called a pennyweight.

**Grain.** Metallic crystal of irregular shape, as revealed under the microscope. When a molten pure metal is cooled, at its melting point it starts to solidify at various centres, which act as nuclei for the growth of crystals. As solidification proceeds, these crystallites grow, the atoms arranging themselves in a regular pattern. Ultimately they interfere with each other, so that none can attain a perfect crystal form as in quartz crystals. Although the grains appear quite irregular, X-ray examination shows the ordered internal arrangement of the atoms inside each grain, with an unsystematic and possibly amorphous layer at the boundaries between neighbouring grains. The size of the grains depends mainly on the speed of cooling, slow cooling resulting in large, coarse grains. Similar considerations apply to alloys.

The grain size of a metal can be changed in the solid state. If the metal is worked, the grains become deformed. Subsequent heating, called annealing, will then cause recrystallisation or the formation of new grains. Grain growth may follow, the new crystallites absorbing each other and so getting larger. In general, the larger the grains get, the softer and more ductile the metal itself becomes.

Grain boundaries are harder than grains themselves, because the finer grained metal, which must have more boundary material, is harder and less ductile. This theory led Sir H. C. H. Carpenter between 1915 and 1925 to attempt to make a metal test piece entirely of a single crystal. His success led to a better understanding of the behaviour of metals. His single crystals showed much greater ductility than the polycrystalline material, and a variation in ductility depending upon the orientation of the crystal. Test pieces composed of two crystals never broke at the grain boundary: proof of its superior strength.

Coarse structures are not always desirable and there are various

methods of grain refinement: by hot working, by recrystallisation at a change point, such as the eutectoid in steels, or by severe cold work and annealing at lower temperatures, which leads to heavy recrystallisation with a fine grain size.

**Grain**, ISLE OF, OR ST. JAMES. Parish and village of Kent, England. Standing at the junction of the Thames and the Medway, it was formerly an island, but has now roadway communication with the mainland. A petroleum refinery here, on which work began in 1950, was seriously damaged in the tidal flood of Jan. 31-Feb. 1, 1953. Here fortifications guard the approaches of the Thames and the Medway.

**Grain**, (RICHARD) CORNEY (1844-95). A British entertainer. Born Oct. 26, 1844, he was called



Corney Grain,  
British entertainer  
Elliott & Fry

to the bar in 1866, but four years later joined the German Reed Company, with which he was associated until his death, March 16, 1895. He wrote over fifty entertainments for the company, and songs and sketches, being the pioneer entertainer at the piano. His autobiography appeared in 1888.

**Grain Coast**. Name formerly applied to a portion of the W. African littoral between the island of Sherbro and the Ivory Coast. The greater part is now under the control of the republic of Liberia. It was noted for melegueta pepper, or grain of Paradise (*v.i.*), hence its name. See Liberia.

**Grainger**, PERCY ALDRIDGE (b. 1882). Australian composer and pianist. Born at Melbourne, July 8, 1882, he studied under Busoni in Germany, and came to London in 1900, living there until in 1915 he settled in the U.S.A. A brilliant pianist, he gave many recitals and often played at concerts. Grainger was influenced by the style of Grieg in his collections and annotations of English, Welsh, and Irish folk songs, and his compositions owe much to the robust vernacular of folk idiom. His works include the Irish reel, Molly on the Shore; the clog dance, Handel in the Strand; Shepherd's Hey; Country Gardens.

**Graining**. The art of imitating woods such as oak, mahogany, walnut, etc., by means of paint.

Upon a ground colour is painted a coat of graining colour, and while this is still wet it is manipulated in such a manner as to remove part of it and expose the ground beneath. Oak graining is the most popular, probably because of the remarkable resemblance to nature which a skilled craftsman can produce. In old houses will often be found examples of graining in excellent condition after more than a quarter of a century. Ability to grain well was at one time the hallmark of the expert painter and decorator, but the teaching of Ruskin, who called graining a "sham," gave the art a great setback from which it recovered only slowly.

**Grain of Paradise**. Seed of two species of the genus *Amomum*, which is included in the family Zingiberaceae.

Both are perennial herbs, and natives of W. Africa. *A. granum-paradisii* has lance-shaped leaves and whitish flowers; *A. meleguetam* more slender leaves and pale pink flowers. The seeds are warm to the taste and have a suggestion of camphor. They are illegally used by brewers and distillers to make the strength of their productions appear greater.

**Grain Ship**. Steam, motor, or sailing ship designed for the bulk carriage of grain. Steam-propelled craft on the inland waterways of N. America transport grain from the prairies through the Great Lakes to the east coast ports of Canada. This type of vessel is in effect a barge, as it consists of a large hold. On the forecabin is a wheel house, and the engines are in the extreme stern. One such ship, the Lemoyne, displaces 10,000 tons on a length of 633 ft. and her engines develop 11,000 h.p. to give a speed of 18 knots. She is able to transport 550,000 bushels in a single load.

A fleet of sailing ships operated by the Finnish shipowner Erikson transports grain between Australia and Europe. Its most famous vessel was the Herzogin Cecilie, 3,111 tons, which in 1927 made the passage from Port Lincoln, S. Australia, to Cobh, Eire, in 88 days. She was wrecked off the S. Devon coast in 1936.

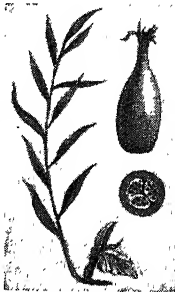
During the Second Great War, grain ship aircraft carriers were built for service in the N. Atlantic. They had a deadweight carrying capacity of 7,930 tons and a speed of 13 knots. The cargo was carried below the second deck, on which was hangar space for Swordfish aircraft. Above was a flight deck 440 ft. long and 60 ft. wide, electric lifts transporting the aircraft from hangar to flight deck. Defensively armed with two Bofors, four Orlikons, and one 12-pdr. gun, and known as a merchant aircraft carrier, this type of grain ship allowed of air cover for convoys during the battle of the Atlantic.

**Gram** OR GRAMME. Unit of weight in the metric system. To provide the desired link between size and weight, the gram was defined as the weight of 1 c.c. of water at 4° C. It is approximately equal to 15.4323 English grains. The kilogram, 1,000 grams, is the standard weight, and is 35.2734 oz. avdp., or roughly 2.2 lb. Thus 1,000 kilograms, a metric tonne, is 2204.6 lb. or 0.98421 tons.

**Gram**, GREEN (*Phaseolus mungo*). Herb of the family Leguminosae, a native of India. Commonly cultivated in India and the Nile Valley, it has a considerable number of varieties, some dwarf and erect, others climbing. It is a hairy plant, with the leaves divided into three oval leaflets. The small whitish flowers are succeeded by hairy, nearly cylindrical pods containing the small seeds which are used as food.

**Gramineae**. Large family of herbs of the grass family. It includes over 3,000 species, natives of all climates. They are mostly tufted, with cylindrical, jointed stems and narrow, alternate leaves. The flowers usually consist of two minute scales enclosed in a boat-shaped glume, together with three stamens and a single-celled ovary. The fruit is a membranous envelope, enclosing the single albuminous seed. Most of them produce nutritious herbage and seeds, which form the principal foods of man and his herds and flocks. The numerous meadow-grasses mainly consist of species with flat leaves that do not roll up in dry weather. The order contains all the valuable cereals—wheat, oats, rye, rice, etc.—sugar-cane, and bamboo.

**Grammar** (Gr. *grammatikē*, the science of letters, *grammata*). This term, originally meaning simply the art of reading, was extended to include the study of literature and all branches of learning generally.



Grain of Paradise.  
Left, plant with  
flower; right, seed  
pod and section

In its more restricted sense, it is the study of the forms and syntax of a language, the art of speaking and writing correctly. But the rules of grammar are not unalterably fixed and final; they merely represent the practice followed in speaking and writing by educated persons at a certain time. Much of what is now bad grammar (*e.g.* I don't know nothing) was once correct. The best authors of the most flourishing period of a literature did not write according to rules; rather, their writings furnished the material on which the rules of the grammarians were based.

Grammar early interested the learned in both east and west. The founders of the science in the west were the Greeks. The sophists and Plato first directed attention to the formation and derivation of words, Aristotle discussed the parts of speech, and the Stoics invented names for cases. Alexandrian grammarians and critics drew up the rules of Greek grammar from the Homeric poems and other masterpieces of Greek literature, and their rules still find a place in modern school books.

In the 1st century B.C. Dionysius Thrax brought out the first complete Greek grammar, and Apollonius Dyscolus (2nd century A.D.) first definitely separated forms from syntax. The Romans made no appreciable contributions to the science, their chief merit being that they translated the Greek terminology and introduced it into Europe. The two most famous Roman grammarians were Aelius Donatus (4th century A.D.) and Priscian (6th century). In the Middle Ages, and even in the Renaissance period, little progress was made; but the discovery of Sanskrit in the 18th century led to a precise formulation of grammar. *See* Language; Phonetics.

**Grammar School.** Type of school for secondary education. Grammar schools were first established in medieval times, when a knowledge of Latin and its grammar was the foundation of education. The curriculum of these early schools comprised little besides Latin and Greek grammar, texts, and translations, and mathematics. Some were founded by monastic orders; many were endowed by merchants or merchant companies; some were organized as chantry and choristers' schools. Henry VIII, when dispossessing the monasteries, necessarily disendowed many of the schools associated with them. During the reign of Edward VI and of Eliza-

beth some restitution was made by the establishment of many new grammar schools. Some of these remain as famous day schools; others have developed boarding establishments. Many of the older grammar schools are now public schools, *i.e.* are represented at the headmasters' conference.

Slowly the concept of education broadened, and the curriculum of the grammar school was extended to include modern languages and history; but Latin, Greek, and mathematics remained the basis of the classroom work, though the larger grammar schools developed as well as their classics side a modern side in which pupils gave more attention to natural science, geography, modern languages, literature, and crafts, and sometimes omit the study of Latin.

The secondary schools set up under the Education Act, 1902, by local education authorities provided a curriculum basically of the grammar school type, *i.e.* it is, fundamentally a preparation for university study. The Education Act, 1944, retained the grammar schools, giving an academic form of education of the traditional type as one of the three types of secondary school to which every child was to go at the age of 11. *See* Modern School; Technical Education.

**Gramme, ZÉNOBE THÉOPHILE** (1826-1901). Belgian electrician, born April 4, 1826. In 1869 he perfected and introduced the method of ring-winding or armature which led to the first practical dynamo. Although discovered by Pacinotti in 1860, this became known as the Gramme winding or Gramme-ring. Gramme died near Paris, Jan. 20, 1901.

**Grammichele.** Town of Sicily, in the prov. of Catania. It stands on an eminence, 1,560 ft. above sea level, 55 m. by rly. (33 m. direct) S.W. of Catania. Clay, stone, and marble quarries are worked, and a trade is carried on in grain, cotton, oil, wine, fruit, and cattle. It was founded in 1693 to replace Occhiala, which had been wrecked by an earthquake. Near by is a cave altar to Demeter. Pop. (1951) 13,949.

**Grammont** (Flem. Geerardsbergen). Town of Belgium, in the prov. of E. Flanders. Situated on the Dendre, 23 m. S.S.E. of Ghent, it has a Gothic 15th-century town hall with four corner turrets and a fountain in the form of a small boy. In the church of S. Barthélemy are two paintings by de Crayer. The rly. line from Alost to Mons passes through Grammont. Pop. (est.) 11,500.

**Gramont, PHILIBERT DE** (1621-1707). French courtier, subject of the *Mémoires* written by Anthony Hamilton (*q.v.*). Of noble descent, Gramont was educated for the Church, but, turning to the army, served with distinction under Condé and Turenne in Flanders and Spain. Banished from the French court on account of an intrigue with one of the mistresses of Louis XIV, he came to London 1662, and mixed freely in the court of Charles II. There he married Elizabeth Hamilton, sister of Anthony. His exile ended in 1664, but he revisited England on diplomatic and court missions. He died in Paris, Jan. 10, 1707.

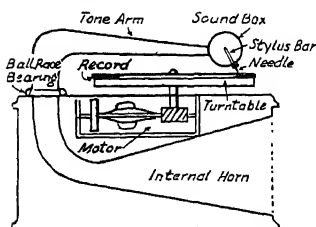
The *Mémoires de la Vie du Comte de Gramont*, published in 1713 as having been dictated by the subject himself, were actually written by his brother-in-law, and give not only a vivacious picture of Gramont, but also an intimate account of the more scandalous aspects of the court of Charles II. They were edited by Scott, 1811; C. Goodwin, 2 vols., 1903; new Eng. trans., P. Quennell, 1930.

**Gramophone** (Gr. *gramma*, letter; *phōnē*, sound). Machine for the reproduction of sound from records of wax or other composition. The original type invented by Edison in 1877 employed cylindrical records; but the introduction of the disk record type by Berliner in 1887 was really the forerunner of sound recording and reproduction for domestic enjoyment. The illustrations on page 3876 show the principal parts of a simple acoustic gramophone. The sound wave track on the record vibrates the needle, and the vibrations are conveyed by the stylus bar to a diaphragm stretched across the sound-box. The sound waves from the diaphragm are fed via the tone-arm to the horn, or tone chamber, which amplifies and distributes the sound.

To incorporate as large a horn as possible in a limited space, the actual tone chamber is often folded back upon itself as shown in the illustration. Although mica diaphragms are satisfactory, some of the best results have been achieved with a diaphragm of corrugated aluminium freely suspended round the periphery. The acoustic gramophone has had only a limited market since the introduction of electrical recording and reproduction in 1925.

In the latter system, the sound waves on the record are converted into electrical currents by a pick-up in which a small armature

attached to the needle holder vibrates between the pole pieces of a permanent magnet. Surrounding the armature is a coil of many turns of wire. The varying



**Gramophone.** Diagrams showing (above) the principles of construction in a simple acoustic gramophone and (right) details of the motor

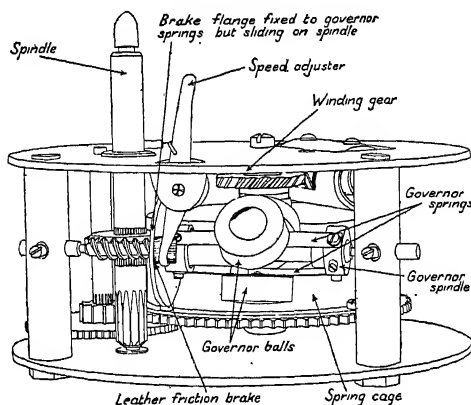
magnetic flux due to the movement of the armature within the coil generates electrical currents which can be conveyed to an amplifier and loudspeaker for reproduction. In radiogramophones, the output from the pick-up is conveyed to the L.F. or output stages of a radio receiver chassis.

The first recording of sound was made in 1859, when Leon Scott de Martinville demonstrated his "phonograph" at a meeting of the British Association and showed that sound vibrations could be "written down" for visual recording. The phonograph consisted of a cylinder mounted in bearings with a handle attached to one end of the spindle. The surface of the cylinder was coated with lamp-black, and when it was rotated, and sound, such as speech, was uttered before a mouthpiece rather like that of a speaking tube, traces of the sound vibrations were drawn as indentations on the blacked surface by a hog's hair bristle attached to a diaphragm.

Scott made no attempt to reproduce the traces back into audible sound; this was first achieved by Edison, who substituted a rigid point for the flexible bristle and covered the recording cylinder with tinfoil instead of lamp-black. When the cylinder with the indented record of sound was revolved under the rigid point, the indentations were played back audibly. The first record thus

made was a recitation of "Mary had a little lamb."

Emile Berliner made a disk record consisting of a paper slip covered with lamp-black on which the recording needle cut a wavy groove of even depth. The record was then fixed with shellac, mounted on a zinc disk, and etched with acid. He next tried to make a complete record, using thick glass coated with lamp-black; the sound indentations were then etched into the glass. In 1888, Berliner made his master record from zinc, from which duplicates



were obtained by making electrotyped metal moulds and pressing them on a soft compound of shellac. Berliner's method of record making has remained almost unchanged, except that records were later made from other materials, e.g. resin, copal. The next advance in gramophone records was electric recording, as explained under Sound Reproduction. Consult *The Fabulous Phonograph*, R. Gelatt, 1956.

**Grampian Hydro-Electric Works.** Electric power source in the Grampians, Scotland. From a dam 1,360 ft. long and 57 ft. high at Loch Ericht, water is taken by aqueduct, completed 1934, to the Rannoch power station at Tummel Bridge.

**Grampians.** Mt. range in Scotland. They dominate the centre of the country, their S. face serving as the barrier between the Highlands and the Lowlands. They stretch from the coast of Aberdeenshire in a S.W. direction to Dunbartonshire, touching also the counties of Banff, Inverness, Kincairdine, Angus, Perth, Stirling, and Argyll. Their highest point is reached in Ben Nevis, 4,406 ft.; other important peaks are Ben Macdui, Ben Lawers, Ben Lo-

mond, Cairngorm, Ben Alder, Ben Cruachan, and Cairntoul. Many rivers rise in the Grampians; e.g. the Forth and Tay, flowing southwards; the Don and Dee, northwards. The mts. include some of the finest scenery in Great Britain: the stretch along the Dee in Aberdeenshire, the wild country at the W. end of the Caledonian Canal, the wooded passes of Perthshire, and the peaks and lochs characteristic of that co. and also Argyllshire. In general the N. parts of the range are barren, and there are extensive deer forests.

**Grampians.** Mountain range of Victoria, Australia. The river Glenelg rises here. Mt. William, 3,825 ft., is the highest summit. The N.E. extension of the range is called the Pyrenees.

**Grampound.** Market town of Cornwall, on the Fal, 9 m. E.N.E. of Truro. It is interesting chiefly on account of its past. It became a town in the Middle Ages. In 1553 it had a mayor and corporation, and began to send two members to parliament, and the votes of the small number of electors were so easily and openly bought that the process became a scandal even in the 18th century. In 1818 an inquiry was held, and in 1821 the borough was disfranchised. Soon after it lost its rights as a borough.

**Grampus.** Popular name for either of two quite different animals. One is *Orcinus orca*, the killer whale. The other is Risso's dolphin (*Grampus griseus*), grey, beakless, about 12 ft. long, and widely distributed. The name is said to be derived from *gras poisson* or *grand poisson*. Pelorus Jack (q.v.) was a Risso's dolphin.

**Gran.** German form of Hron (q.v.), a river of Hungary.

**Gran.** German name of Esztergom (q.v.).

**Granada.** Name of the last Moorish kingdom founded in Spain. It endured 1238-1492. The city of Granada and its environs fell into Moorish hands about 1013, coming under the rule of the caliphs of Córdoba. It prospered, and became the capital of an independent principality. The kingdom began with the acclamation of Mahomed-ben-Alhamar as king in 1238: he conquered Loja, Guadix, Baza, and other places, and made Granada his capital.

Gradually the Christians won back Spain from the Moors, and later in the 15th century Granada alone remained to the Moors. Ferdinand and Isabella at length turned their arms against it, and, owing to rivalries among the ruling

family, Granada fell an easy prey. The Moors were beaten in battle; their last ruler, Boabdil, formally resigned his kingdom to the Christians who, Jan. 2, 1492, entered the city of Granada. Thenceforward the kingdom formed part of Spain. See Alhambra; Moors; Spain; History.

**Granada.** Maritime prov. of Spain, in Andalusia. Bounded S. by the Mediterranean, it formed part of the old Moorish kingdom. The surface is mountainous, and it contains, in the Sierra Nevada, the highest points of Spain, one of the most picturesque regions in Europe. Well watered, chiefly by the Genil and its tributaries, it is extremely fertile.

The old town, Albaicin, which stands on a neighbouring hill, although the poorest part of the city and the dwelling-place of gipsies, is most picturesque. There are remains of the Moorish walls and towers, the Alcázar, the Casa del Cabildo (or old university), the water conduits and other buildings which once made Granada a great trading city and a famous seat of arts and learning. The more modern town contains the cathedral, public buildings, promenades,



Granada, Spain. The centre of the city and the cathedral

plazas, gardens, fountains, etc. It has many educational and philanthropic institutions, carries on a large trade in agricultural produce, and manufactures textiles, liqueurs, soap, and paper. In the *Capilla Real*, in the cathedral, is the sarcophagus of Ferdinand and Isabella, and in the convent of San Jeronimo lies Gonzalo de Córdoba, conqueror of Naples. Pop. (1950) 154,378.

On the invasion of the Iberian peninsula by the Saracens in the 8th century, some, mainly Syrians from Damascus, established themselves near the site of the ancient Illiberis. The settlement grew in importance, and during the Middle Ages became the wealthiest and most splendid city in Spain. As the capital of the Moorish kingdom of Granada it flourished for centuries until the Moors began to give ground during the wars with Alfonso XI and Pedro the Cruel.

In 1482 Ferdinand and Isabella began their task of expelling the Moors from Spain, and in 1492 Boabdil, the last king of the Moors, was compelled to abandon his capital. The city thereafter declined in prosperity and importance. It was taken by the French in 1810 and 1823. It suffered from seismic disturbances in 1884-85 and from a disastrous conflagration in 1890.

**Granada.** Fifth largest city of Nicaragua, capital of the dept. of Granada. It stands on Lake

Nicaragua, 28 m. by rly. S.E. of Managua and 118 m. S.E. of the port of Corinto. Founded in 1524, Granada is well built, and has fine churches and public buildings. It trades in dye woods, sugar, coffee, cocoa, wool, and hides, and makes boots and shoes and gold-wire chains. There are cocoa plantations in the environs. The city suffered three invasions by British and French pirates, and in 1856 much of the old city was burned down by the Filibusters (*q.v.*). Pop. (1954) 35,975.

**Granadilla.** Edible fruits of several species of *Passiflora* (passion-flowers), though the name properly refers to the large greenish-yellow fruits of *P. quadrangularis*. These are about 6 ins. in diameter, with sweet, slightly acid, purple pulp. The plant is a native of Nicaragua, but is widely cultivated in the tropics. It has strongly scented white and red flowers.

**Granby.** A city of Quebec, Canada. In Shefford co., on the Yamaska river, it is 47 m. by C.N.R. east of Montreal. The manufactures include rubber products, furniture, tobacco, and maple products. Pop. (1956) 27,095.

**Granby, MARQUESS OF.** Title borne by the eldest son of the duke of Rutland, Granby being a village in Notts, not far from Belvoir. Its most notable bearer was the English soldier John Manners. The eldest son of the third duke, he was born Aug. 2, 1721. Educated at Eton and Trinity College, Cambridge, he saw service with Cumberland's army in the Jacobite rising of 1745. During the Seven Years' War, in 1759 he became commander of the British



Granada. Map of the southern Spanish province, which contains the loftiest peaks in Spain

Warm in the plains and cool in the hills, it has the products of alpine and sub-tropical regions, Sugar-canes, beetroots, cereals, fruit, cotton, and flax are grown, and silk, wine, and oil produced. There are textile factories, tanneries, and iron works, but sugar refining is the primary industry. There are various minerals and marble quarries, and precious stones are found. Area, 4,838 sq. m. Pop. (1950) 782,953.

**Granada.** City of Spain, capital of the prov. of Granada. It stands on the slopes of two hills and on the plain connecting them, 63 m. N.E. of Málaga. Abundantly supplied with water, and having a delightful climate, this old Moorish city, the last seat of the Muslim rulers of Spain, is peculiarly interesting. The Alhambra (*q.v.*) manifests Moorish power and art.



Granada arms



John Manners, Marquess of Granby  
After Reynolds



contingent, in which capacity he did brilliant work, notably at Warburg, Brückermuhl, Gravenstein, and Wilhelmstahl. He returned home in 1763, and became commander-in-chief in 1766, his conduct in this position being attacked by Junius. For many years Granby was M.P. for Grantham, and he represented Cambridge-shire from 1754 until his death at Scarborough, Oct. 18, 1770. This was the marquess whose name is borne by many public houses.

**Gran Chaco.** This region of central S. America is entered as Chaco, El Gran: see Chaco War.

**Grand.** River of the U.S.A. Its headstreams rise in Iowa, and unite in Gantry co., Missouri, through which state the river flows S.E. to its junction with the Missouri river near Brunswick. Its length is about 300 m.

**Grand.** River of Colorado and Utah, U.S.A. A headstream of the Colorado river, it rises in the Rocky Mts., and flows 350 m. S.W. to the Green river, which it joins in the S.E. of Utah, and has cut deep and precipitous cañons.

**Grand.** A river of Michigan, U.S.A. Rising in Jackson co., in the S. part of the state, it flows W. and N. to Lansing, where it again follows a W. course, and enters Lake Michigan at Grand Haven. It is 280 m. long, and navigable for 40 m. up from its mouth.

**Grand, SARAH** (1855-1943). Pen-name of Frances Elizabeth McFall, British novelist (Irish by birth). She married at 16 Lieut.-Col. M'Fall, and was widowed in 1898. Her first novel, *Ideala*, was written at 26, but her reputation chiefly rests upon *The Heavenly Twins*, 1893, memorable for its uncompromising handling of sex problems. The subject was skilfully developed in *The Beth Book*, 1897. A supporter of the woman's movement, she wrote the *Winged Victory*, 1916: *Variety*, 1922. Thrice mayoress of Bath, she died May 12, 1943.

**Grand Alliance.** Name given to the alliance of European Powers against France in 1701. Louis XIV of France refusing to recognize the treaties by which arrangements for a partition of the Spanish possessions had been made, accepted for his grandson the crown of Spain.

To counter this, William III formed the alliance between the Empire, England, and Holland, who signed a treaty agreeing to compensate the emperor for the loss of Spain, on Sept. 7, 1701. The alliance, joined in 1702 by Prussia, and in 1703 by Portugal and Savoy, carried on the War of the Spanish Succession (*q.v.*).

**Grand Army of the Republic.** Not a military body, but a civilian association in the U.S.A. of men who had fought on the side of the North in the Civil War. It was formed in 1866 to preserve the memory of fallen comrades and give aid to soldiers' widows and orphans and needy veterans. It became a powerful political force allied with the Republican party, exerting pressure on congress to secure legislation about pensions. At one time it reached a membership of over 400,000.

**Grand Banks.** Submarine elevation, extending about 200 m. to 300 m. S. by E. of Cape Race, Newfoundland. The area is about 500,000 sq. m.; the depth varies from 10 to 160 fathoms. The waters swarm with fish, especially cod, and fishing is free. The season lasts from June to mid-Nov. See Fisheries; Newfoundland.

**Grand Bassam.** Port in the French colony of the Ivory Coast. It stands on the Gulf of Guinea, at the entrance of a lagoon, which forms a well protected harbour. It is a leading port in the colony, but trade is somewhat hampered, owing to the fact that Abidjan, the coastal terminus of the main line of rly., is situated on the adjacent mainland. Grand Bassam was formerly the seat of the governor of the colony. Gold is found near. Pop. 5,743.

**Grand Canal.** Main waterway of Venice. It winds through the city in the shape of a letter S, and from it other canals branch in all directions. On its banks are most of the famous palaces of the city, and near it is the Piazza of

S. Mark. The Rialto bridge crosses it. (See Venice.) Another Grand Canal extends from Dublin to Ballinasloe in Ireland.

**Grand Canal.** Canal of China, stretching from Hangchow to Tientsin, a distance of 850 m. At Chinkiang, 280 m. from Hangchow, the Yang-tse divides the canal into two portions. The construction of the middle section, from the Yang-tse to the Yellow river, which was in use in 480 B.C., is attributed to the 6th century B.C. The S. section was added between A.D. 605 and 617, and the N. part, from the old bed of the Yellow river to Tientsin, during 1280-83.

**Grand Cañon.** Deep gorge in Arizona, U.S.A., cut by the Colorado river. It is the most remarkable of a series of cañons, extending for about 1,000 m. along the river's course, and presents a scene of unequalled natural grandeur and weirdness. The gorge extends for 217 m., is more than a mile deep in places, and is 4-18 m. broad at the brim. Its geological formation gives it exceptional coloration. J. W. Powell (1834-1902), of the U.S. geological survey, was the first white man to make the passage of the gorge, 1869. In 1956 two aeroplanes carrying 128 people were lost, with all on board, in the Grand Cañon.

**Grand Combe, LA.** Town of France. In the dept. of Gard, it is 31 m. N.W. of Nîmes. There are coal and other mines around the town, which is also a glass-making centre. Pop. (1954) 14,565.

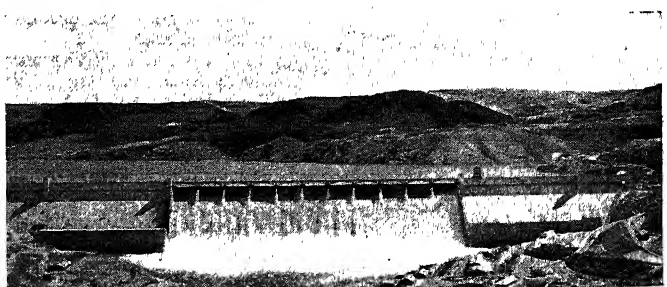
**Grand Cornier.** Mt. of Switzerland, in the canton of Valais. Situated N. of the Dent Blanche, near the Matterhorn, it reaches an alt. of 13,020 ft. The ascent by the Col de Bricolla is difficult, but not dangerous; that from the Col du Grand Cornier (11,628 ft.) is longer and more difficult. See Alps.

**Grand Coulee Dam.** Irrigation and hydro-electric plant on the Columbia River, Washington, U.S.A., constructed by the U.S.



*Sarah Grand*

Russell



**Grand Coulee Dam.** This enormous concrete dam over the Columbia river, Washington, was put into operation in 1941

bureau of reclamation. The dam, which started working March 22, 1941, is built of concrete and is 550 ft. high. It impounds a reservoir, Lake Roosevelt, 82,000 acres in area, 151 m. long. The dam is the key structure of the Columbia basin irrigation project, which serves 1,200,000 acres—an area that could support up to 350,000 persons. First water for irrigation was released May 29, 1952. The spillway discharges 1,500,000 galls. per sec. and creates a waterfall as great as Niagara. Hydroelectric plants at the base of the dam have a capacity of 1,964,000 kilowatts. Total cost of dam and generating plants was \$26,000,000.

**Grand Duke.** Title ranking above that of duke. It first appeared in 1557, when Pius V gave it to the duke of Tuscany. It was held by the Medici family and later by the Hapsburgs, who retained it after they had been deprived of Tuscany in 1859. Most other grand dukes date from the reorganization of Europe in 1815. There were several in Germany before 1918—Saxe-Weimar, Baden, Oldenburg, the two Mecklenburgs, and Hesse-Darmstadt. The present ruler of Luxemburg is called grand duchess. Grand duke was used to translate the title borne by members of the imperial family of Russia before 1918.

**Grand Duke, THE.** Thirteenth and last of the so-called Gilbert and Sullivan operas, *i.e.* with libretto by W. S. Gilbert, music by Arthur Sullivan. The alternative title was *The Statutory Duel*. Produced at the Savoy Theatre, London, March 7, 1896, it was considered inferior to any of its predecessors, ran for only 123 performances, and was never revived.

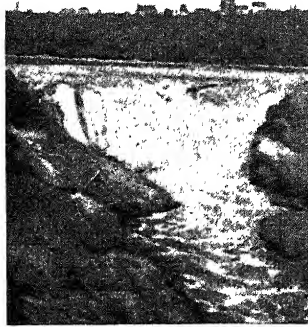
**Grandee** (Span. *grande*). Spanish title. Borne by the highest nobles, it carried many privileges. Grandees were exempt from taxes, and from arrest except by special warrant from the king, and could even join the service of the king's enemies. They were allowed to remain covered in the king's presence. Their privileges were gradually curtailed, and Joseph Bonaparte abolished the title. It was revived 1834, shorn of privileges.

**Grande-terre.** Eastern of two islands which make up the French territory of Guadeloupe (*q.v.*).

**Grand Falls.** Cataract of Labrador. It is on the Grand or Hamilton river, about 252 m. W. by S. of Hamilton Inlet. It descends over 315 ft., has a breadth of 200 ft., and is one of the finest cataracts in N. America.

**Grand Falls.** Town of Newfoundland, on the Exploits River, about 22 m. from its mouth. It is connected by rly. with the port of Botwood. It takes its name from the falls, and owes its origin to the development of water power there by the Anglo-Newfoundland Development Company, Limited, whose pulp and paper mills, begun in 1906, and completed three years later, are among the largest in the world. Pop. (1951) 16,059.

**Grand Falls.** Town of New Brunswick, Canada, capital of Victoria co. It stands on the St.



Grand Falls, New Brunswick. The falls of the St. John river

John river, near its falls, 202 m. N.W. of St. John, and is served by C.P.R. and C.N.R. Some 80,000 h.p. from the falls have been developed by the International Paper Co. of New York. The town lies in farming country. Pop. (1951) 2,365.

**Grandfather Clock.** Popular term for a domestic clock in a tall case made to stand on the floor. Usually it is 5 ft. 10 ins. and over; if much below that height, it is called a grandmother clock. A clock standing 4 ft. 10 ins. and less is sometimes called a granddaughter clock. The grandfather clock first appeared c. 1675. Previously a similar type of clock hung on the wall with weights and pendulum exposed.

With the introduction of the anchor escapement in 1675, the swing of the pendulum was reduced and it was possible to case in the pendulum and weights. Clock cases generally were in advance of the prevailing fashion in furniture. The earliest cases are of oak with walnut veneer; then followed marquetry; ebonised work; lacquer work; oak; and then mahogany, approximately in that order. The first grand-

father dials were square, made of brass with a silvered hour circle or zone and of simple design, eventually developing into an arched dial with elaborate decorations. Some dials, principally of country make, are painted with a rocking ship, a rising or setting moon, etc. Rarely, Battersea enamel is used. Country-made grandfather clocks are as a rule not as well proportioned as the London models; hence the clocks of the London makers are much sought after for their superior craftsmanship.

Among the old masters is Thomas Tompion (?1639-1713), who is buried in Westminster Abbey. One of Tompion's clocks has changed hands for £8,000. Others whose work is prized by collectors are Edward East, Daniel Quare, Joseph Knibb, Daniel Delander, and George Graham.

**Grand Fleet.** Name given to Great Britain's principal naval force during the First Great War. Numbering about 400 ships, it was based upon Scapa Flow in the Orkneys; Invergordon in Cromarty Firth; and Rosyth in the Firth of Forth. The Harwich force, but not the Dover Patrol, came under it. During the last year of the war an American battle squadron of five ships formed part of it. Just before the war the Grand Fleet was commanded by Sir G. A. Callaghan, who was replaced by Sir John Jellicoe immediately war was declared. Upon the latter becoming first sea lord in Nov., 1916, Sir David Beatty was appointed commander-in-chief of the Grand Fleet, and he retained that post until the end of the war, when the Grand Fleet was dispersed.

**Grand Forks.** Second largest city of North Dakota, U.S.A., the co. seat of Grand Forks co. It stands at the union of the Red Lake river with the Red river of the North, 82 m. N. of Fargo, and is served by rly. It contains Wesley and the Lutheran Bible Colleges; and about 2 m. from the city is the suburb of University, the seat of the state university. Grand Forks is a distributing centre for an agricultural district, and has flour mills, meat packing plants, beet sugar factories, printing plants, and fox fur farms near by. Settled in 1871, it received a city charter in 1881. Pop. (1950) 26,836.

**Grand Guignol** (Fr.). Type of horrific theatrical entertainment. Guignol is the name of the chief personage in French marionettes. France is the home of Grand

Guignol, with its special interest in blood, horror, sex, and death. It was popular in Montmartre at the end of the 19th and beginning of the 20th centuries. The Grand Guignol Theatre was originally an artist's studio, surviving characteristics of which were arched windows, rafted roof, and carved decorations. *Les Trois Messieurs du Havre* was an outstanding thriller in the Grand Guignol repertoire on its first London appearance in 1908 at the Shaftesbury Theatre. In this piece a rich banker was represented as being hanged from a curtain pole in view of the audience. In 1920 José G. Levy inaugurated a Grand Guignol season at the Little Theatre, London.

**Grandi, DINO, COUNT** (b. 1895). Italian politician. Educated at Bologna university, he entered journalism. He became one of the original members of the fascist party, taking part as a staff officer in the march on Rome in 1922. After holding cabinet appointments, Grandi became ambassador to Great Britain in 1932. Upon Italy's entry into the Second Great War, he became minister of justice. When Italy sued for an armistice in 1943, Grandi was one of the leading fascists to oppose Mussolini, and fled to Portugal. In 1947 a Rome assize court acquitted him on all charges of fascist activity.

**Grand Island.** City of Nebraska, U.S.A., the co. seat of Hall co. Near the Platte river, 155 m. W. by S. of Omaha, it is served by rlys. It has an R.C. cathedral and the U.S. central monitoring station of the federal communications commission. The surrounding region produces cereals and livestock. The city has stockyards, a horse and mule market, rly. shops, pack-

ing plants, flour mills, and canneries. Laid out in 1866, the city took its name from a narrow strip 42 m. long between the river's two channels. Pop. (1950) 22,682.

**Grandison, SIR CHARLES.** Hero of *The History of Sir Charles Grandison*, a novel by Samuel Richardson, told in letters, first pub. anon. 1753-54. Intended to be a character of ideal human goodness, Sir Charles is a prig rather than a hero.

**Grand Junction Canal.** Former name of part of the Grand Union Canal (*q.v.*).

**Grand Jury.** In English law, a body of men who, at assizes or quarter sessions, decided whether or not there was a *prima facie* case against an accused. If they held there was such a case they found a true bill and the accused was then tried before a petty jury. Grand juries were abolished in 1933 except in a few cases in London and Middlesex. *See* Jury.

**Grand' Mère.** City of Quebec, Canada, in Champlain co. On the St. Maurice, 90 m. N.E. of Montreal and 95 m. W. of Quebec, it is served by C.P.R. and C.N.R. An important industrial centre, the city is administered by a council-manager. Pop. (1956) 14,023.

**Grand Mufti.** Turkish title used during the sultanate and given to the supreme head of the Ulemas (servants of religion and laws). A mufti is a consulting canon lawyer in Islam. The office of grand mufti was abolished in Turkey in 1924, but that title was assumed by Haj Mohammed Emin el Hussein, spiritual head of the Arabs in Palestine. *See* Hussein.

**Grand National, THE.** Principal British cross-country horse-race. Inaugurated in 1839, it takes place annually at Aintree, normally on the Friday of the Liverpool Spring Meeting. The course is 4 m. 856 yds., and includes 30 jumps. The water jump is 15 ft. broad, and two other difficult obstacles, both taken twice, are Becher's and Valentine's Brooks. The race was suspended in 1916-18, substitute events being held at Gatwick; it was again suspended in 1941-45. Five horses have won twice: Abd-el-Kader, 1850 and 1851; The

Lamb, 1868 and 1871; The Colonel, 1869 and 1870; Manifesto, 1897 and 1899; Reynoldstown, 1935 and 1936. Poethlyn won it in 1919, having been successful in the substitute race in 1918. The highest weight carried to victory is 12 st. 7 lb., this being achieved by Cloister, 1893; Manifesto, 1899; Jerry M., 1912; Poethlyn, 1919. Record time is credited to Golden Miller, 9 mins. 20.4 secs., in 1934. Winners 1907-57 are listed in the table below. *See also* N.V.

**Grand Period.** Physiological term for the time which elapses between the beginning and cessation of growth of an organism or its part. The rate of growth is at first slow, but accelerates with the passage of time to a maximum. Then deceleration sets in and is progressive till growth ceases.

**Grand Popo.** Seaport of the French W. African territory of Dahomé. In the extreme W., it lies 25 m. W. of Whydah. A rly. along the Togoland border links it with Lokossa.

**Grand Pré.** Village in King's co., Nova Scotia, Canada. Situated on the shores of the basin of



Grand Pré, Nova Scotia. The Evangeline statue unveiled in 1920

Minas, 46 m. N.W. of Halifax, it was the scene of the surprise, defeat, and capture of Col. Noble's Massachusetts regiment by the French in 1747, and of the expulsion of the Acadians by the British in 1755, which forms the theme of the first part of Longfellow's poem *Evangeline* (*q.v.*). By a purchase the C.P.R. secured control of the well beside the willows on the farm that tradition associates with Evangeline's story,

#### GRAND NATIONAL WINNERS FROM 1907

1907 Eremon	1930 Shaun Gollin
1908 Rubio	1931 Grakle
1909 Lutteur III	1932 Forbra
1910 Jenkinstown	1933 Kellsboro Jack
1911 Glenside	1934 Golden Miller
1912 Jerry M.	1935 Reynoldstown
1913 Covertcoat	1936 Reynoldstown
1914 Sunloch	1937 Royal Mail
1915 Ally Sloper	1938 Battleship
(1916 Vermouth)	1939 Workman
(1917 Ballymacad)	1940 Bogskar
(1918 Poethlyn)	1946 Lovely Cottage
1919 Poethlyn	1947 Caughoo
1920 Troytown	1948 Sheila's Cottage
1921 Shaun Spadah	1949 Russjan Hero
1922 Music Hall	1950 Freebooter
1923 Sergeant Murphy	1951 Nickel Coin
1924 Master Robert	1952 Teal
1925 Double Chance	1953 Early Mist
1926 Jack Horner	1954 Royal Tan
1927 Sprig	1955 Quare Times
1928 Tipperary Tim	1956 E.S.B.
1929 Gregalach	1957 Sundew

and here in 1920 Lady Burnham unveiled a statue of Evangeline. The statue, in bronze, by Henri Hébert, was cast in Paris.

**Grand Prix** (Fr., great prize). Name of several sporting events. The Grand Prix de Paris, a horse-race for three-year-olds, is held at Longchamps over 1 m. 7 fur. An English horse named Ranger won the first race in 1863. Grand Prix motor races, held in several Continental countries, are for specially designed cars, weight and/or engine size being the only limiting factors. (See Motor Racing.) Annual motor cycling Grand Prix races are held over the Isle of Man circuit.

**Grand Prix de Rome.** State prize for composition at the Paris conservatoire which is competed for annually in July, the result being announced in Nov. The successful candidate is crowned with laurel, proclaimed *lauréat*, and sent to Rome to study for four years, during which time he receives an income from the French government. The *proximo accessit* receives a gold medal. A similar Prix de Rome at the Brussels conservatoire is awarded at intervals of two years. See Prix de Rome.

**Grand Rapids.** City of Michigan, U.S.A., the co. seat of Kent co. On the Grand river, at the head of navigation, it is 65 m. W.N.W. of Lansing, and is served by the Michigan Central and other rlys. and an airport. It contains a Roman Catholic cathedral, an art gallery, and a unique museum devoted to furniture. It is one of the world's greatest furniture manufacturing centres, and also turns out motor bodies and parts, sheet metal goods, musical instruments, plumbing fixtures, springs and bedding, paints and varnish, and paper products. Gypsum is mined. Grand Rapids has the largest Dutch colony in the U.S.A. Founded in 1833, it was incorporated five years later, granted a city charter in 1850, reincorporated in 1905. Pop. (1950) 176,515.

Another city, in Wisconsin, formerly bearing this name, is now called Wisconsin Rapids.

**Grand Remonstrance.** THE. In English history, the statement of the case of the commons against Charles I. It was drawn up by the Long Parliament in 1641, immediately before the outbreak of the Civil War. The first part detailed the acts of misgovernment committed by the king after his accession; subsequent sections dealt chiefly with suggested remedial measures, such as the adoption

of safeguards against Roman Catholicism, guarantees for the better administration of justice, and the prevention of the employment as ministers of worthless persons. After acrimonious debate the Grand Remonstrance was passed by 159 votes to 148, Nov. 22, and presented to the king, Dec. 1, 1641.

**Grands Mulets.** Rocky ridge on the N. slope of Mont Blanc, France. It lies at an alt. of 10,030 ft. on the track from Chamonix to Mont Blanc (*q.v.*).

**Grandson** OR GRANSON. Town of Switzerland, in the canton of Vaud. It stands on the lake of Neuchâtel, 3 m. by rly. N. of Yverdon. It has an ancient Romanesque church, recently restored, and a fine castle dating from the 11th century, long the seat of the baronial family of Grandson. Captured by the Bernese in 1475, it was taken in Feb., 1476, by Charles the Bold, duke of Burgundy, whose massacre of the garrison led to the famous battle of March 3, 1476, near the town, in which Charles was disastrously defeated by the Swiss.

**Grand Union Canal.** Largest British artificial waterway, formed in 1929 by an amalgamation of the following canal companies: Regent's Canal and Limehouse Dock, Grand Junction, Warwick and Napton, Warwick and Birmingham, Birmingham and Warwick Junction. In 1932 it was extended by taking over the Leicester Navigation, Loughborough Navigation, Erewash, and Hertford Union Canals. With other canals it was nationalised 1948.

Except for a stretch of some 5 m. W. from Braunston, Northants, which forms part of the Oxford Canal, the canal covers the 147 m. route from London to Birmingham. Numerous branches bring its total length to 240 m. The route extends via Brentford Lock to Norton Junction, at which point the canal bifurcates. One section continues 48 m. to Birmingham, the other 42 m. to Leicester, thence to Loughborough and Langley Mill. There are 6 tunnels, the longest being the Blisworth tunnel of just over 3,000 yds. Between Brentford and Birmingham there are 159 locks. Some sections have recently been enlarged, and the canal can take craft up to 72 ft. in length, 7 ft. beam, 3 ft. 9 ins. draught, and 7 ft. 6 ins. head room. See Canals map facing p. 1704.

**Grange** (late Lat. *granea*, barn). Term now used for a country house with farm attached, and also for a

better-class farm. It has been applied to a granary, a barn, a farm, occasionally to a collection of farms, and hence a village or hamlet, and especially, in the Middle Ages, to outlying farm buildings belonging to a religious house or lay lord where crops for tithe or rent were stored.

**Grange** OR GRANGE-OVER-SANDS. Urban district and seaside resort of Lancashire, England. It stands on Morecambe Bay, 9 m. N.W. of Carnforth. On the fringe of Lakeland, it has a mild climate and beautiful surrounding country. There are hotels, two golf courses, a swimming pool, public gardens. Pop. (1951) 3,028. At Grange is the Merlewood nature conservancy research station. Two miles away is Carmel, with a 12th-century priory, the only one in Lancs not destroyed at the dissolution of the monasteries. Humphrey Head, where water from the holy well is said to have curative powers and where the last wolf in England was killed, is 4 m. distant.

**Grangemouth.** A burgh and seaport of Stirlingshire, Scotland, 3 m. N.E. of Falkirk. Here the Grange and Carron rivers run into the Forth. Mainly a modern town, it arose at the terminus of the Forth and Clyde canal, and has extensive docks and a rly. station. Coal and iron are shipped, and ore is landed for the Falkirk ironworks. There are shipbuilding yards, sawmills, a petroleum refinery, and chemical and soap factories. The burgh is included in the burgh constituency of Stirling and Falkirk burghs. Pop. (1951) 15,432.

**Grange Party** OR GRANGERS. An economic organization in the U.S.A., in full the Society of Patrons of Husbandry. It was founded in 1867, the prime mover being O. H. Kelley, a farmer from Minnesota, and its main object was to foster the agricultural interest. A secret society, it restricted membership to those engaged in agriculture; women were eligible with men. Until 1873 its influence was marked and to it much legislation was due, the railways being of interest to the Grangers. From 1890 the movement was a social and educational organization. As a political force it was superseded by the Farmers' Alliance.

**Granger**, JAMES (1723-76). An English writer and print collector. Born at Shaftesbury and educated at Christ Church, Oxford, he became vicar of Shipplake, where he died April 4, 1776. He wrote a Biographical History of England, from Egbert to the Revolution.

1769, which he lavishly illustrated with the engraved portraits he had collected. This history was added to by other hands, one copy containing 3,000 portraits.

The process of extra-illustrating a book with pictures relating to all that the book contains has been known since as grangerising. The grangeriser, having made his collection, takes his book to pieces, inserts the extra illustrations in the most appropriate places, and has the whole bound anew. Notable examples of this kind of work are the Crowle copy of Pennant's History of London, in the British Museum; and Sutherland's Clarendon and Burnet, in the Bodleian.

**Granicus.** Ancient name of the modern Bigha Chai, a river of the Troad, Asia Minor. It flows into the Propontis or Sea of Marmara, and is famous as the scene of the battle in which Alexander the Great defeated the Persians in 334 B.C.

**Granite** (Ital. *granito*, grained, speckled). Coarsely crystalline rock generally considered to be of igneous origin, composed essentially of quartz and alkali feldspar, with lesser quantities of muscovite or biotite mica, hornblende, tourmaline, etc., any of which may be present to the exclusion of the others. Minor accessory minerals—zircon, apatite, magnetite—are usually present. Granites occur in the earth's crust in large irregular masses which may cover thousands of sq. m. Such large bodies are referred to as batholiths; smaller masses are termed stocks or bosses.

Some granites have consolidated from a liquid melt of much the same composition as the present rock, and have been injected (squirted) into place. Others were perhaps formed by reconstitution of the original country rocks by chemical reaction with heated solutions from depth, which converted the older rocks, more or less *in situ*, into granite. This process of conversion of solid rock into granite without its passing through a fluid stage is known as granitisation.

Granite is a rock which was formed at considerable depth below the surface, and is found typically where mountain building movements occurred in the past. That now exposed at the surface has been uncovered by erosion stripping away the overlying roof-rocks. Ore deposits are often found near and at the margins of granites, e.g. the Cornish tin veins, and lodes of copper and tungsten, etc.

Granites are normally grey or pink. Their strength and light

colour make them desirable building stones, but their hardness makes them expensive to work. Fine grained granites are used for road metal, but coarser varieties cannot stand up to modern traffic. Granite is found in Scotland, the Lake District, N. Wales, Cornwall, and Devon. Aberdeen granite is grey; Peterhead, red; Dalbeattie and Ballachulish, grey. Most Cornish varieties are grey, and Shap (Westmorland) is pinkish with characteristic flesh-coloured feldspar crystals. Graphic granite is a variety in which the quartz and feldspar have crystallised together; it is found, among other localities, on Mt. Sinai. See Geology; Petrology.

**Granitite.** Variety of granite in which the mica constituent is represented by biotite alone.

**Granodiorite.** Coarsely crystalline rock, intermediate between granite and diorite in composition and appearance. It is composed of quartz, orthoclase, and plagioclase feldspar, biotite mica, and/or hornblende. Its mode of occurrence and origins are similar to those of granite (*q.v.*), and many masses originally mapped as granite are now recognized as being granodiorite. Most of the continental areas of the earth's crust is granodiorite.

**Gran Sasso d'Italia** (Great Rock of Italy). Mt. mass of the Apennines (*q.v.*). It lies between the provs. of Teramo and Aquila. The highest peak is Monte Corno (9,580 ft.), the loftiest point of the range. Other peaks are Corno Piccolo, 8,650 ft.; Pizzo d'Intermesole, 8,680 ft.; Pizzo Cefalone, 8,307 ft.; and Monte della Portella, 7,835 ft. Generally snow-capped, it commands an extensive view, including the Dalmatian Mts. Summer and autumn are the best seasons for making the ascent, from Aquila or Teramo. It was first ascended by Orazio Delfico in 1794. There is an Italian Alpine Club hut near the summit.

After his resignation, July 25, 1943, Mussolini was confined by the Badoglio government in a former hotel on the Gran Sasso, from which he was rescued on Sept. 12 by Nazi parachutists and

flown to Germany in an aircraft which landed on a narrow plateau in front of the building.

**Grant** (Lat. *credentare*, to entrust). Literally, permission and thus a gift, the implication being that such a gift carries with it a privilege of some kind. It is thus used especially in law, where it means the conveyance of property from one person to another by deed. A deed of grant is now the proper method of conveying freehold property; but it is used in many other cases also, whether the property be real or personal. A grant-in-aid is money allowed by parliament to local authorities in aid of local services.

**Grant, DUNCAN JAMES CORROWR** (b. 1885). A British painter. Born at Rothiemurchus, Inverness-shire, he was educated at S. Paul's School, and became a pupil of J. E. Blanche in Paris in 1909. Noticeably influenced by Cézanne and van Gogh, his decora-



Duncan Grant. Girl at the Piano, an example of this artist's work in the Tate Gallery, London

tive panels and designs for applied art, no less than his easel pictures, reflected his inventiveness in colour and outstanding draughtsmanship, as well as a constant appreciation of the beauty of pigment. A member of the London Group, he exhibited at the leading galleries. In 1941 one of his pictures was purchased by the Chantrey Bequest, and he is represented in the Tate Gallery.

**Grant, JAMES** (1822-87). British novelist. Born at Edinburgh, Aug. 1, 1822, related through his mother to Sir Walter Scott, he served, 1840-43, as an ensign in the 62nd Foot, studied for a time in an architect's office, and then devoted himself to literary work. Of his 56 novels, most of which deal with military life or Scottish history, the most notable is The Romance of War, 1845, based on his father's stories of the Peninsular

War. He also wrote *Old and New Edinburgh*, 1880; *Scottish Soldiers of Fortune*, 1889; *The Tartans of the Clans of Scotland*, 1886; and other books. A pioneer of the volunteer movement, he died in London, May 5, 1887.

**Grant, JAMES AUGUSTUS** (1827-92). British soldier and explorer. Born at Nairn, April 11, 1827, and educated at Marischal College, Aberdeen, he received a commission in the 8th Native Bengal Infantry, 1846. He took part in the siege of Gujarat, 1849, and the relief of Lucknow, 1857, when he was wounded. He accompanied J. H. Speke (*q.v.*) in exploring the sources of the Nile, 1862-63, and published *A Walk Across Africa*, 1864. In 1868 he accompanied the Abyssinian expedition under Napier as intelligence officer. He died at Nairn, Feb. 11, 1892. His collection of dried plants is in the herbarium at Kew Gardens.

**Grant, ULYSSES SIMPSON** (1822-85). American general and President of the United States. He was



*U. Grant*

born April 27, 1822, at Point Pleasant, Ohio, and named Hiram Ulysses—the name by which he became famous was given him by mistake at the Military Academy at West Point; to his contemporaries he was known as Sam. His father procured for him a nomination to West Point. He was commissioned in the infantry and fought with distinction in the Mexican War. He was then transferred to the Pacific Coast where, in an isolated post, he drank to excess and in 1854 was requested to resign from the army. For the next seven years he drifted from one job to another, until the Civil War found him a clerk in his father's leather store, at Galena, Illinois.

Given command of a regiment of volunteers, Grant rapidly showed unsuspected powers of command, gained a fluky success at Belmont, and suddenly became famous by capturing Forts Henry and Donelson. Then he was surprised by Albert Sidney Johnston at Shiloh (or Pittsburg Landing) and the doubtful victory he gained over Beauregard after Johnston's death was bought by heavy losses.

Grant's next job was to capture the great Confederate fortress of Vicksburg, a task that took many months of preparation, fighting,

reversals, and changes of plan before the Federal troops entered the beleaguered city on July 4, 1863. He won the most brilliant of his victories on Nov. 24, 1863, by storming the heights above Chattanooga and driving Bragg's army before him in rout. The rank of lieutenant-general, hitherto conferred only on Washington, was revived for him by statute; he was given effective command of all the Federal armies, and took over the command in the East. Lee proved a more formidable foe than any Grant had faced in the West. The base of the army was transferred to the James, and the long siege of Petersburg began. Grant became responsible for the whole war policy of the Federal government—for the permission given to Sherman to cut loose from his base, for the decision to send Sheridan to clear the Valley of Virginia; and he had his reward when Lee's attempt to break away to the South was foiled, and Lee surrendered at Appomattox Court House, April 9, 1865; a surrender received with a natural magnanimity by Grant.

Grant now became involved in the turbulent politics of the period of reconstruction. Made Republican presidential candidate by acclamation, he was easily elected in 1868. In Hamilton Fish, Grant chose an excellent secretary of state, but otherwise few presidents have been less fitted for the job. Silent, obstinate, with a remarkably bad judgement in friends, he had a naïve admiration for the rich, and almost every department of his administration was involved in scandals. He was renominated and re-elected in 1872; but the great panic of 1873 prostrated business, ruined speculators, and infuriated the public. More and more scandals besmirched the reputation of the party in power and, despite not very well concealed aspirations after a third term, Grant was passed over. He set off on a tour round the world, and on his return in 1879 was welcomed by the "stalwart" Republicans, but they failed to secure his nomination in 1880.

Grant, who had given up his military emoluments when he became president, rashly lent his name to a brokerage house and was involved in its ruin. To pay his debts, though he was dying of cancer, he wrote his memoirs. This, among the best books of military memoirs in English, restored the fortunes of its author's family and, to a great extent, his

own reputation. Grant died July 23, 1885, and was buried in a huge, ugly mausoleum on Morningside Heights in New York. *Consult* *Personal Memoirs*, 1885-86; U. S. Grant, *Politician*, W. B. Heselbine, 1935; *Captain Sam Grant*, Lloyd Lewis, 1950; *Lincoln Finds a General*, K. P. Williams, 1949-52.

**Granta.** Name of the headwaters of the river Cam, England. Up to the 12th century the whole river was called Granta, and Cambridge is referred to in *Domesday Book* as *Grantebrige*. The Granta rises in Essex between Saffron Walden and Bishop's Stortford, and flows N.W. until it is joined by the river Rhee. After its confluence with the Bourn Brook, just S. of Grantham, it is called the Cam. A long-established undergraduate publication of Cambridge University is called *The Granta*.

**Grantham.** Village of Cambridgeshire, England, 2 m. S.S.W. of Cambridge. Of great beauty, it is the subject of a famous poem by Rupert Brooke. Tennyson lived here for a time; Byron gave his name to a pool in the river Cam just above the village; and this pool was almost certainly that of the mill at Trumpington in the *Reeve's Tale of Chaucer*. A mill stood on the site until 1928, when it was destroyed by fire. There are Roman and Saxon remains in the village, including an earthwork near the church. The approach from Trumpington is preserved by the Cambridgeshire Preservation Society.

**Grantham.** Borough and market town of Lincolnshire, on the Witham, 25 m. S.S.E. of Lincoln.



*Grantham arms*

An important rly. junction, it is also on the Great North Road. The parish church of S. Wulfram with its massive tower and tall spire is a magnificent building of mainly 13th-century construction and is noted for its window tracery, crypt, and chained library. The Angel Inn once belonged to the Templars. The market cross and the 16th-century conduit house in the market place are scheduled ancient monuments. Sir Isaac Newton was educated at the grammar school, an ancient foundation called King's School from its re-foundation charter of Edward VI.

Grantham is of Saxon origin and is recorded in the *Domesday Book*. Its charter of incorporation was granted in 1463. It gives its name to a county constituency. The





Grantham, Lincolnshire. Parish church of S. Wulfram, showing the 14th century spire, 280 ft. high

chief industries are concerned with mechanical engineering, and the town is an important producer of earth-moving equipment and oil engines; the caterpillar track was invented here. During the First Great War the Machine Gun Corps was formed at Grantham; during the Second Grantham was a training centre for the R.A.F. and the R.A.F. Regiment. Two ancient fairs are held in the Market Place annually. Market day, Sat. Pop. (1951) 23,555.

**Grant Land.** The N. part of Ellesmere (q.v.) Island, Canada.

**Grantley,** FLETCHER NORTON, 1st BARON (1716-89). English lawyer, born at Grantley, near Ripon, June 23, 1716. He was called to the bar in 1739, entered the house of commons for Appleby in 1756, and remained therein, sitting for various constituencies, until 1782. In 1762 he was made solicitor-general and in 1763 attorney-general. He was elected speaker of the house in 1770, but lost the position in 1780, largely owing to the way he had addressed the king about money matters in 1777. But he was raised to the peerage in 1782. An able but unscrupulous lawyer, he figured in the public prints as Sir Bull-face Doublefee. He died Jan. 1, 1789. Richard (b. 1892) succeeded to the title as 6th baron in 1943.

**Granton.** A seaport of Midlothian, Scotland. It stands on the Firth of Forth and within the

city of Edinburgh. It has a good harbour, with two breakwaters and facilities for coaling, and is the headquarters of several steamship lines and a landing place for the North Sea trawlers. Coal, cotton, etc., are exported, and timber, grain, tobacco, etc., imported. *See* Edinburgh.

**Grantown.** Police burgh and market town of Morayshire, Scotland. It stands on the Spey, 23 m. S. of Forres, on main and branch railway lines. The capital of Strathspey, Grantown is finely situated amid magnificent forests of pine and birch, and is frequented as a health resort. Distilling is carried on. The town was founded in 1776 by Sir James Grant, hence its name, and near it is Castle Grant, seat of the earls of Seafield. Pop. (1951) 1,541.

**Granulation.** Process used in metallurgy to obtain metals in such a state that they have a large surface area. The molten metals are poured into large vats of cold water and freeze rapidly into small granules. Lead, zinc, copper, etc., may be treated, either so that the metal is in a suitable form for some subsequent process or to obtain a sample for analysis. A similar process is used to obtain fine metal for use in powder metallurgy, the molten metal being passed through a fine sieve and so in thin streams into the water. *See* Powder Metallurgy.

**Granulite** (Lat. *granulum*, little grain). Metamorphic rock commonly derived from sandstones by alteration, but sometimes formed from igneous rocks. It consists mainly of quartz, feldspar, mica, and garnet. Common in Scotland in the Moine series of rocks, it is also found in other areas where ancient rocks are exposed. To French geologists *granulite* indicates a granite containing both muscovite and biotite micas.

**Granville** OR GRANVELLA, ANTOINE PERRÉNOT DE (1517-86). Spanish prelate and diplomatist, born Aug. 20, 1517, at Besançon. His father was chancellor to the emperor Charles V. Educated at the universities of Padua and Louvain, Antoine became a priest, and in 1540 was made bishop of

Arras. But his father's influence, no less than his own aptitude, led him into political life, and he attended some of the sittings of the council of Trent in the emperor's interest, and was responsible for the treaties between Charles and his German foes in 1547 and 1552. He helped to arrange the marriage between Mary and Philip II, and in 1559 settled in the Netherlands as chief adviser to the regent. During 1570-75 Granville was viceroy of Naples for Philip II, after which he held a controlling position in state circles at Madrid. He was made archbishop of Malines in 1560, archbishop of Besançon in 1584, and a cardinal in 1561. He died at Madrid, Sept. 21, 1586. His letters and papers have been valuable to historians.

**Granville.** Town and watering-place of France, in the dept. of Manche. Built on a promontory, where the river Bosq enters the English Channel, it is divided into the lower and the upper town, the latter being surrounded by fortifications and containing the citadel. The Gothic church of Notre Dame was restored in the 15th-16th centuries. The town has a good



Granville, France. The lower and upper towns, from the south

harbour and a shipping trade.

Granville was fortified by the English when they held France, but was taken from them in 1450. They possessed it again later, but, having fortified it in 1640, finally lost it in 1641. On July 31, 1944, U.S. armoured units captured Granville from the Germans, finding the town largely undamaged, though the harbour installations had been destroyed. A small German force, probably from the Channel Islands, raided the town on the night of March 8-9, 1945. Pop. (1954) 10,368.

**Granville,** GRANVILLE GEORGE LEVESON GOWER, 2ND EARL (1815-91). British statesman. The eldest son of the 1st earl, he was born May 11, 1815, and was

educated at Eton and Christ Church, Oxford. Related to the great Whig families, he entered parliament for Morpeth in 1836, and was an under-secretary under Melbourne. In 1846 he succeeded to his father's earldom, and a succession of offices fell to him in the cabinets of Russell, Aberdeen, and Palmerston. In 1851 he was foreign minister, in 1852 president of the council, in 1854 chancellor of the duchy of Lancaster, and in 1855 again president. He resigned with his colleagues in 1858.

In 1855 Granville became leader of the Liberals in the house of lords. During 1868-70 he was colonial secretary under Gladstone. He was foreign secretary 1870-74, and again 1880-85, but his performance was subjected to severe criticism. He followed Gladstone on Home Rule, and in 1886 was for a short time colonial secretary. A cultured man of gracious personality, and alive to the need for educational improvement, Granville was chancellor of the university of London, 1856-91. He died March 31, 1891.

**Granville, WILLIAM SPENCER LEVESON GOWER, 4TH EARL (1880-1953).** British sailor and administrator. He was born on July 11, 1880. Commissioned in the Royal Navy in 1900, he served in the suppression of the slave trade in the Red Sea in 1902-03. In 1929 he became naval A.D.C. to the king; in 1931 he was promoted rear-admiral and appointed commanding officer coast of Scotland; he retired from the Royal Navy in 1935 with the rank of vice-admiral. He was lieutenant-governor of the Isle of Man 1937-45, and was governor of Northern Ireland 1945-52. Earl Granville, who succeeded his brother in this title in 1939, married in 1916 Lady Rose Bowes-Lyon, sister of George VI's consort. He died in London June 25, 1953.

**Granville Barker, HARLEY GRANVILLE (1877-1946).** British man of the theatre. Born in



H. Granville Barker, British actor-manager

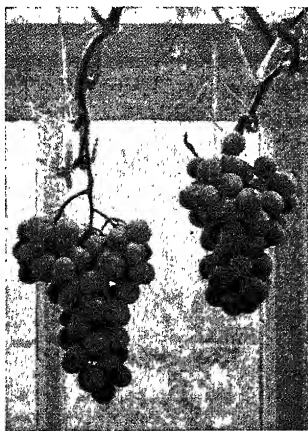
London, Nov. 25, 1877, he became an actor under Ben Greet, was associated with the Stage Society (founded 1899), and in 1904 entered with J. E. Vedrenne on the management of the Court Theatre and later the Savoy Theatre, London. This management marked an epoch in

the English stage; most of Shaw's and many of Ibsen's plays appeared under its aegis, and in 1912 there was an outstanding production of Twelfth Night.

Granville Barker's own plays include *The Voysey Inheritance*, 1905; *Waste*, 1907; their dialogue shows the influence of Shaw.

His first wife was Lillah McCarthy (*q.v.*); his second Helen Huntington-Gates (died 1950), whom he married in 1918, and with whom he collaborated in adaptations of the plays of Martinez Sierra and the Quintero brothers. He translated Schnitzler's *Anatol* and *Romans*; Dr. Knock; and wrote (with William Archer) *A National Theatre*, 1907. He directed the British institute in Paris, 1937-39, and was visiting professor at Yale, 1940-43. He died in Paris, Aug. 31, 1946. *Consult* Life, C. B. Purdom, 1955; Shaw's *Letters* to G.B., 1957.

**Grape.** Fruit of the vine (*Vitis vinifera*), a shrub of the family Vitaceae. The vine, a native of



Grape. Black Hamburg grapes, a fine variety for growing under glass

the Mediterranean region, was apparently introduced into Britain at the start of the Christian era.

A few of the small-berried grapes can be grown out of doors on a sunny wall in the S. and W. districts of Great Britain, but the finer varieties can be satisfactorily cultivated only under glass. Royal Muscadine, Miller's Burgundy, Black Cluster, and Brant are some of the best grapes to plant against a house or garden wall. The Strawberry grape, Royal Muscadine, and Grizzly Frontignan can be grown in an unheated greenhouse that is open to the sun; the berries are not large but are of delicious flavour. In a heated greenhouse

the large-berried black grape, *e.g.* Black Hamburg, Alicante, Gros Colmar, and the white-berried Foster's Seedling will thrive. A rather higher temperature is required to grow the Muscat grapes to perfection. Of these, Muscat of Alexandria and Cannon Hall (white) and Mrs. Pince and Madresfield Court (black) are very fine.

As grape vines will remain productive for generations, even for a century and more when grown in a large glasshouse (the famous vine at Hampton Court, which is still flourishing, was planted in 1768), it is of the first importance to prepare the sites thoroughly by making a border 2 ft. deep, 3 ft. wide, and 4 ft. long for each vine; the soil should consist of pieces of old turf with the addition of some well-decayed manure and a scattering of bone-meal. The border is made outside the greenhouse and the stem of the vine is brought inside through a hole in the greenhouse wall.

Pruning is an important detail of cultivation. Every winter the side shoots must be pruned to within one or two buds of the base of the past summer's growth, and in summer the tips of the green shoots must be shortened to prevent an excessive growth of leaves. *See* Vine.

**Grape Fruit.** Common name for the shaddock or pomelo, the globular or oblate fruit of the *Citrus decumana*, a tree closely related to the orange and lemon (*q.v.*). The tree is an evergreen of the family Rutaceae, and is now unknown in a wild state. It has downy shoots and oval leaves, with winged leaf stalks, and bears a white flower. Its fruit, called grape fruit from their habit of growing in bunches, are usually from 4 ins. to 6 ins. in diameter, and have a yellow rind. The pulp, which has a slightly acid flavour, resembles that of a lemon.

The grape fruit is a native of the Malayan archipelago, but it was not cultivated until the 17th century, when some trees were transplanted to the W. Indies. The fruit was first imported into Europe in 1707 by a merchant in Amsterdam. It gained little popularity in Europe, but in the W. Indies and the United States was eaten as a breakfast food.

Early in the 20th century grape fruit was imported into Great Britain, at first on a small scale only. Between 1920 and 1938, however, imports increased from 1,700 to 87,000 tons. The principal

countries growing grape fruit for export are the U.S.A., Palestine, Cuba, S. Africa, and Jamaica.

**Grape Hyacinth** (*Muscari racemosum*). A bulbous herb of the family Liliaceae. A native of both



Grape Hyacinth. Leaves and flowers of this bulbous herb

Europe and S. Africa, it has long, slender, half-rounded leaves, and a short flower stem, bearing many round dark-blue flowers.

**Grape Pear** (*Amelanchier canadensis*). Small tree of the family Rosaceae. It is a native of N. America. It has oblong-elliptic, toothed leaves, and large white flowers in drooping sprays. The fruit is globular, of crimson or purplish colour, sweet, and agreeable.

fornian fruit-fields. The title was taken from the battle hymn of the Republic, wherein occurs this reference to the Lord: "He is trampling out the vintage where the grapes of wrath are stored." A film, based on the novel, and directed by John Ford for 20th Century Fox company, was released in 1940.

**Grape Sugar.** The solid form of glucose, which is described under Dextrose.

**Graph** (Gr. *graphein*, to write). Diagrammatic representation of quantitative facts, experimental results, etc. Graphical methods have principally two uses: (a) by appealing to the eye to impress on the mind changes in such quanti-

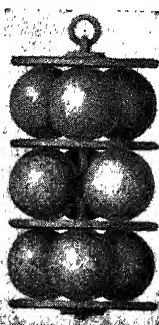


Grape Pear. Leaves, flowers, and fruit of this North American tree

ties as temperatures, sales, costs of production, population, etc., and (b) to help in the analysis of statistics, experimental results, etc. They are, therefore, a means of displaying quantitative facts,

and a mathematical tool for elucidating quantitative relationships.

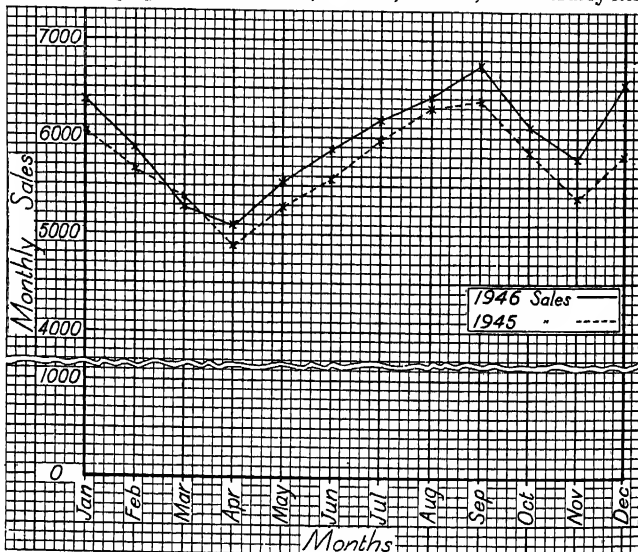
Graphs are usually prepared on squared paper ruled in tenths of an inch or in millimetres. A suitable scale of distances is taken horizontally to represent the independent quantity, such as units of time, and a suitable scale of distances is taken at right angles to it to represent the dependent quantities, such as temperature, sales, etc. Thus: suppose the following are the details of the sales of a business during the twelve months of 1946: (£s) 6,374; 5,869; 5,267; 5,083; 5,547; 5,863; 6,174; 6,395; 6,728; 6,085; 5,741; 6,562. The scale of months should be taken horizontally, say,  $\frac{1}{2}$  in. to a month. The scale of £s sales should be taken vertically. This scale should be such as to indicate the fluctuations clearly, so that they can be comprehended at a glance. The range of the sales is from £5,083 to £6,728, that is, about £1,700. A scale of 1 inch to £1,000 suggests itself. Since no item is less than £5,000, the scale can conveniently be broken as indicated in the accompanying figure—it is generally thought desirable to show the zero of the vertical sale. The monthly figures must first be "plotted." Above the point indicating a particular month, a small cross should be made at the appropriate distance indicated by the scale. Thus, the cross for the January item of £6,374 should be made above the point marked January at a distance of  $13\frac{3}{4}$  small squares above the £5,000 line; the February item



Grape-shot, an obsolete projectile

resembling a bunch of grapes. When fired the shot broke up and distributed the bullets in a shower in a somewhat similar manner to case-shot, but at a greater distance from the muzzle of the gun. It has been entirely replaced by shrapnel (*q.v.*). See Ammunition.

**Grapes of Wrath, THE.** Novel by John Steinbeck. Published in 1939, this best-seller depicted the adventures of a family who, evicted from the "dust-bowl" of Arizona, emigrate to the Cali-



Graph. This example serves to compare the fluctuations in sales over a period of two years, as explained in the text

of £5,869 should be "plotted" by making a cross exactly above the point marked February and at a distance of  $8\frac{1}{2}$  small squares above the £5,000 line. The points thus indicated by crosses should be joined by straight lines. The resulting graph shows immediately the marked seasonal fluctuations. The value of the graph is increased if the corresponding graph for the preceding year is drawn either alongside or on the same space in distinctive ink or by a distinctive line, as shown on the diagram.

Such a graph shows the *amount* of fluctuation, and may be deceptive, for an increase of £1,000 on £5,000 may have a different effect from an increase of £1,000 on £10,000. It is often more necessary to show the ratio of the change than its amount. To graph the rate of change the logarithms of the quantities are graphed instead of the quantities themselves. Ordinary paper can be used, the vertical scale being a scale of logarithms; or semi-logarithmic paper, specially ruled for such ratio charts, can be purchased. The use of ratio charts has much increased of recent years. *Consult* Treatise on Graphs, G. A. Gibson, 1904; Charts and Graphs, K. Karsten, 1923.

**Graphic Statics.** Method used for obtaining the relations between forces, external and internal, acting on a body or framework in engineering. Forces are represented in magnitude and direction by straight lines, and by compounding them together according to the law of the polygon of forces, the forces in any part of a framework may quickly be obtained. The representation of these forces is called the stress diagram, and from it can be obtained by direct measurement the force in any particular member of a structure, as a bridge. *Consult* Graphical Statics, L. Cremona, Eng. trans. L. H. Beare, 1913; Theory of Structures, A. Morley, 1918.

**Graphite.** A form of carbon (C), popularly known as black-lead. A very soft, black, opaque mineral, it has the same composition as diamond, but a different crystalline structure. Graphite is found principally in metamorphic rocks, such as gneiss and schist (Madagascar, Germany, Korea), and in marbles (Canada), which have been subjected to heat and pressure by natural agencies; graphite occurs also in veins (Ceylon). The source of the carbon in gneisses and schists, limestones and veins is considered to be the

carbonaceous sedimentary material, mineral carbonates, and gaseous carbon compounds respectively. Graphite can also be made artificially by heating anthracite to a high temperature in an electric furnace.

Twelve p.c. of the world's graphite is baked in moulds with a special fireclay to form the "lead" in lead pencils. Sixty p.c. is used in foundries and in making graphite crucibles for metallurgical purposes. Moulds used for castings are coated with graphite (and sometimes talc) to prevent the casting from sticking and to give it a smooth surface.

Graphite crucibles are made by firing a mixture of graphite, clay, and sand.

Finely pulverised graphite, often mixed with grease, oil, or water, is used as a lubricant. Other uses are in graphite paints, stove-polish, electrodes, brushes for dynamos, dry batteries, and glazing powder. In the trade, very fine graphite is called "amorphous" and a slightly coarser type is termed "crystalline."

**Graphitisation.** An effect produced in cast irons by annealing, whereby the iron carbide, cementite, becomes converted into free or graphitic carbon. White cast iron is extremely hard and brittle, but this can be reduced to some extent by malleabilising, which gives malleable cast iron. Two processes are commonly used, the white-heart and the black-heart; in the former the carbide is converted to graphite and later partially oxidised and lost by packing in haematite ore and heating at over 900° C., whereas in the latter it is formed into nodules by heating to about 800° C. in a neutral atmosphere, giving greater malleability with slightly less strength. *See* Cast Iron; Iron.

**Graphology** (Gr. *graphein*, to write; *logos*, discourse). The art or science of interpreting human character from the handwriting. Graphology derives from the fact that between a person's character and the specific development of his, or her, writing independent of all teaching or material influences, there is a definite relationship. This individuality becomes visible from about the tenth year, and though handwriting is affected by the state of health, the emotions, the outward circumstances of the writer, yet it preserves a number of ineluctable characteristics even when—as e.g. in the case of Lord Nelson—the loss of the right arm suddenly enforces an awkward

writing with the left hand, or with the toes or the mouth after loss of both arms.

Graphology does not rely on particular curvatures or angles in a handwriting, but on the sum total of a person's handwriting, called the formative level. Nearly everybody reacts, when opening a letter, to an unknown handwriting, forming a judgement of the "character" of the writer. This intuitive reaction was first registered, and brought into a sort of system, by the Italian physician, Camillo Balbo, in 1622; the Swiss philosopher, J. K. Lavater, in 1775, wrote a short study linking handwriting with physiognomy; the Frenchman, J. H. Michon, 100 years later, published a System of Graphology, and his pupil Crépieux-Jamin set going the serious study of graphology in which psychologists and psychiatrists have cooperated.

The practical value of graphology lies in the expert analysis of documents and signatures whose authenticity is disputed; in the confirmation, or otherwise, of the psychiatric examination of a case, and in the initial sifting and later promotion, especially on the Continent and in the U.S.A., of applicants for employment.

**Grapple** (from Fr. *grappe*, a hook). Small anchor with four or more hooks radiating in a circle from a common stem. It is not used where any great holding strength is required, but only for anchoring small boats, and sometimes as a kedge in warping or hauling. Grappels are used by cable ships to hook up submarine cables for repair, and by balloons to get a grip on the ground. In sailing-ship warfare, grappels attached to ropes enabled one ship to seize and hold on to another. A special type recovers drills broken in boring oil or artesian wells. *See* Anchor.

**Grappa.** Mt. of Italy, the highest in a range between the valleys of the Brenta and the Piave. The Grappa region became prominent when fighting took place there between the Italian and Austro-German forces in 1917 and 1918.

**Grapple-plant** (*Harpagophytum procumbens*). Prostrate perennial herb of the family Pedaliaceae, a native of S. Africa. The leaves are hand-shaped, the purple flowers funnel-shaped. The large fruits are armed with strong, sharp hooks which cling to the skins of animals, and so get transported from place to place, the numerous angular seeds being shaken out by the



Grapple-plant. Leaves, flower, and fruit of this S. African herb

movements of their carriers. When they come in contact with the lips of browsing animals they cause intolerable pain. Dr. Livingstone has told how an ox will stand and roar with the pain and sense of helplessness inflicted by these fruits attached to its mouth, which also prevent its feeding.

**Graptolitoidea** (Gr. *grapto*, lettered; *lithos*, stone; *eidōs*, form, likeness). Group of extinct low organisms, remains of which are found in early sedimentary rocks. They are often to be seen on slates, forming a fossilised film, and looking rather like a flattened branch of seaweed or seafirs. These organisms were tiny marine animals belonging to the Hydrozoa.

**Gras, Félix** (1844–1901). Provençal novelist and poet. He was born May 3, 1844, at Malemort,



Félix Gras, Provençal author

Vauchuse. His first work, *Li Carboundé*, won him an immediate position among the *féli-bres*, an association for the revival of the Provençal language and literature. This was followed in 1882 by *Tolozà*, an epic dealing with Simon de Montfort and the persecution of the Albigenses. Then came *Lou Roumançero Provençal*, a collection of traditions of the country in ballad form, 1887; *Li Papalino*, tales in prose dealing with days of the popes at Avignon, 1891; and three impressive novels of the French Revolution, all of which have been translated into English by C. A. Janvier, *The Reds of the Midi*, 1896; *The Terror*, 1898; and *The White Terror*, 1900. Gras, who succeeded to leadership of the *féli-bres* in 1891, died March 4, 1901.

**Grasmere.** Lake and village of Westmorland, England. The lake

is one mile long and about  $\frac{1}{2}$  mile wide. It is beautifully situated in a valley in the centre of the Lake District, surrounded by the mountains. The village, which stands where the Rothay falls into the lake, is 4 m. N.W. of Ambleside and 12 m. S.S.E. of Keswick. It is noted for its associations with Wordsworth, whose early residence, Dove Cottage, is here. In it De Quincey also lived. In the churchyard are the tombs of Wordsworth and Hartley Coleridge. An annual festival, called the rushbearing, takes place here on the Sat. nearest S. Oswald's day, August 5. The place has also an athletic meeting in August. S. Oswald's Church is partly a 13th century building. Grasmere is a good centre for visitors to Keswick, Coniston and elsewhere, and there is boating on the lake. With Ambleside urban district and some smaller areas, it was in 1935

formed into the Lakes urb. dist.

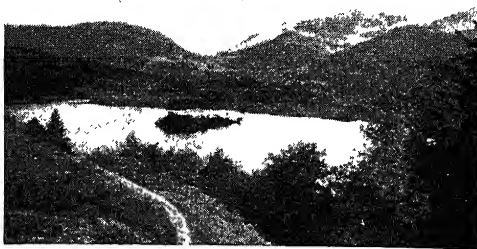
**Grass.** The family Gramineae; infarming language also clovers and other herbage growing in a field. A distinction is drawn between temporary grass, or ley, intended to be ploughed up after a short interval, and permanent grass, which occupies the land continuously, either as pasture devoted to grazing, or as meadow yielding a hay crop at regular intervals. When first laying down land to grass, both careful cleaning and the preparation of a fine seed bed are necessary.

The mixture of seeds sown varies according to the object in view. For temporary leys those species of grass and clover are chosen which are short-lived but of rapid growth, while perennial types make up the mixtures used when permanent grass is to be established. The exact nature of the mixture will depend on the local soil and climate. Only seed of the highest quality should be used.

The management of established pastures calls for considerable skill. At the end of winter and beginning of spring chain harrowing and rolling are beneficial. By the former process dung is spread out, molehills levelled, and moss removed, while rolling consolidates the soil round the roots and encourages a thick growth of herbage.

Cattle must not be turned on too early, certainly not until late in April; sheep crop grass very closely, so that they can get a good living after the other kinds of stock have had their turn. Pastures devoted to fattening stock need little artificial manuring, but where lime is deficient this may be supplied, either in the form of quicklime or of ground lime. Poor pastures benefit from dressings of potash or phosphates; remarkable results have been obtained from the use of basic slag.

Meadows, after being grazed, need chain harrowing and rolling,



Grasmere, Westmorland. The lake and village seen from the south

and stones or the like should be removed when a hay crop is to be gathered later. Large dressings of manure are necessary, more especially if a hay crop is taken every year. Every three or four years farmyard manure, up to 10 tons per acre, can be applied with advantage, supplemented by a complete mixture of artificial fertilisers in years when the meadow has not been dunged.

The world's great natural grasslands are known by various names, prairies in Canada, steppes in Russia, pampas in S. America, veld in S. Africa, downs in Australia. On the desert edge the grasslands degenerate into scrublands; on the forest edge they become parklands or savannahs.

In Western Europe and in New Zealand the natural vegetation is forest, but the trees have been cleared and the land devoted to arable and pasture. In New Zealand, cleared land is sown, usually with English grass seed, and sheep and cattle are fed upon the resulting crop. Upon mt. ranges in medium latitudes the higher levels where trees do not grow usually become meadows during the summer months.

These summer pastures are the "Alps" and are used in Switzerland and similar countries for the summer feed of flocks and herds.



1. Yorkshire fog. 2. Meadow foxtail. 3. Short-headed foxtail. 4. Marram grass. 5. Timothy. 6. Matt grass. 7. Reed canary grass. 8. Sweet vernal. 9. Tufted hair grass. 10. Heath grass. 11. Crested

dogtail. 12. Rough spiked dogtail fescue. 13. Meadow fescue. 14. Quaking grass. 15. Smooth-stalk meadow grass. 16. Soft brome. 17. Sterile brome grass. 18. Italian rye grass.

**GRASSES FOUND IN MEADOW AND MOORLAND OF GREAT BRITAIN**



Some natural grasslands, such as the pampas, are sown with alfalfa or lucerne, an excellent food for cattle, which thrives especially in a slightly alkaline soil and in a dry climate. Other grasslands have been turned to arable: e.g. the great wheatlands of N. America were originally prairie. See *Ley Farming*; *Pasture*.

**Grass Cloth.** Term commonly applied to fine fabrics woven from certain Oriental plants which are not grasses, especially to that made from China grass (*Boehmeria nivea*), which is a nettle-like plant. The inner fibres of Manila hemp, a plant of the banana family, produce good grass cloth, much used in Europe for articles of dress. The cloth made from true grasses, e.g. esparto, is coarse.

**Grasse.** Town of France. In the Alpes-Maritimes dept., it is 19 m. W.S.W. of Nice. On a mt. slope, 700–1,380 ft. above sea-level, sheltered from the cold winds of the N. and open to the S., it is a favourite winter resort and a centre for the manufacture of perfumes and essences, about 60,000 acres being devoted to the culti-

stitute the pasture and all the meadow plants that will convert into hay. The crops of his corn-fields, whether wheat, barley, or oats, he does not refer to as grass, though they, as well as the sugarcane and bamboos of the tropics, are equally grasses. These grain-bearing grasses, including maize and rice, constitute the staple food of the human race, while the fodder grasses supply indirectly the greater part of man's animal diet. Their great importance is due to the richness of their seeds in the matter of starch and the high percentage of protein. Certain grasses, such as esparto, yield fibres that are of value in the making of paper and cordage. Grasses are found in nearly every part of the world where there is a little soil, from the tropics to the Arctic regions, and from high-water mark up to the limits of vegetation on the mountains. See *illus.* page 3889.

**Grassholm.** Island 6 m. off the coast of Pembrokeshire, Wales. A small flat-topped island of Old Red Sandstone with a thin carpet of turf, it is one of the 23 places in the world where gannets are known to breed, and during the season the birds and their nests cover its surface. Cormorants and other sea-birds are also found. There are no human inhabitants. Bought and turned into a bird sanctuary by Malcolm Stewart in 1940, it was used in 1945 by the R.A.F., despite protest, as a bombing practice target. In 1947 the island, area 23 acres, was bought by the R.S.P.B.

**Grasshopper.** Orthopterous (straight-winged) insects of the Acrididae and Tettigoniidae families. Remarkable for their long hind legs and jumping powers, they are common in fields during summer. They vary in colour from green to brown, and the species differ much in size. The Tettigoniidae are usually green in colour, with long antennae and an ovipositor in the female. The Acrididae have short antennae and a reduced ovipositor.

Locusts belong to the Acrididae. The familiar chirp is produced in the Tettigoniidae by rubbing the wings together, and in the Acrididae by drawing the edge of the wing



Grasshopper. Great green grasshopper, *Locusta viridissima*. Top, *Meconema thalassinum*

along the inner side of the femur. Most of the species feed upon plants, but some eat other insects. See *Locust*.

**Grassman's Law.** In philology, name given to the explanation of certain exceptions to the law of consonantal interchange known as Grimm's Law. It deals with the aspirated mutes (gh, kh, dh, th, bh, ph) and lays down the principle that, when an original Indo-European root began and ended with an aspirate, only one was allowed to stand in Sanskrit and Greek, e.g. Skt. *bhavamī*, Gr. *phuō*, I become, but *babhūva*, *pephuka*, I became. See *Philology*; *Phonetics*.

**Grassmarket.** Thoroughfare of Edinburgh, Scotland, between West Port and the Cowgate. A weekly market has been held here since 1477. A stone cross marks the site of the ancient gallows, where many of the Covenanters were executed. During the riot of 1736 between the populace and city guard, Captain Porteous was dragged here from the Tolbooth and hanged from a dyer's pole.

**Grass of Parnassus** (*Parnassia palustris*). Perennial herb of the family Saxifragaceae. It is a native of Europe, N. Africa, N. and W. Asia, and N. America. It is a plant of bogs and wet moors, with long-stalked heart-shaped leaves, and large solitary white



Grass of Parnassus, leaves and flowers



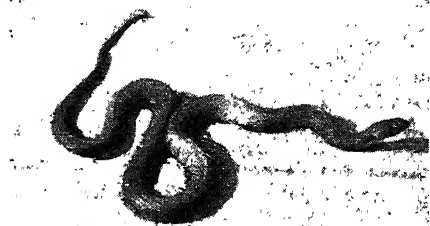
Grassholm. The small island off the Pembrokeshire coast preserved as a sanctuary for gannets and other sea-birds

vation of roses and orange flowers. The parish church, an old cathedral, dates from the 12th–13th centuries; the hôtel de ville, with a 12th century tower, the hospital, and the casino are notable features, and there is a public park. Fragonard, the painter, was a native. Grasse was liberated from the Germans by U.S. troops Aug. 24, 1944. Pop. 21,217.

**Grasses.** Name loosely applied to many plants of diverse nature, but more correctly indicating those of the family Gramineae (*q.v.*). Although both in genera and species they are outnumbered by the orchids, in individuals grasses predominate over all other green vegetation. When the farmer speaks of grass he is referring to all the fodder plants that con-

flowers on tall stems. The petals are thick and veined. The large ovary bears four stigmas. Five of the ten stamens have been transformed into scales bearing nectar glands, and fringed with hairs ending in yellow knobs.

**Grass Snake** (*Natrix natrix*). One of the commonest non-poisonous snakes of Europe, part of Asia, N. Africa, and England,



Grass Snake. Specimen of this harmless snake, common in England

being unknown in Scotland and Ireland. Greenish-grey to brown above, with black bands, which give it the alternative name of ringed snake, it is black and white underneath. It has two white or yellowish-white spots behind its head which distinguish it some distance away. Growing to 3 or 4 ft., the grass snake feeds chiefly on frogs, toads, and fish, and is usually found in damp places. The eggs, varying from 15 to 30, the size of a dove's egg, are laid in rich damp mould, manure heaps, and similar places. See Snake; Water Snake.

**Grass Tree** (*Xanthorrhoea*). A genus of perennials of the family Liliaceae, natives of Australia. They are also known as black-boy and grass gum-tree. They have short, thick trunks like those of palms, rough with the bases of former leaves, consolidated by red or yellow gum produced by the plant. The long, wiry leaves are like those of the rushes, and form a great tuft. The central flower-stem may be 15 ft. to 20 ft. long, its upper end a dense spike of small flowers. *X. arborea*, the Botany Bay gum, and *X. hastilis*, when denuded of leaves, have frequently been mistaken for men (black-boys). Cattle eat the leaves, and the natives the middle of the top of the stem. The fragrant resin exuded is known to commerce as Botany Bay resin and black-boy gum.

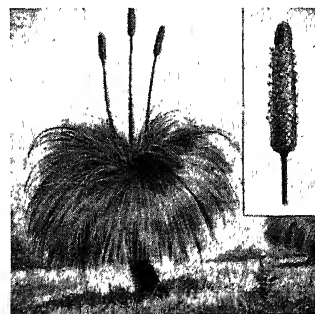
**Grass-wrack** (*Zostera marina*). A perennial marine plant of the family Naiadaceae. It is a native of most temperate coasts, where it grows submerged about low water. Its slender, grass-like, bright green

leaves are from 1 ft. to 3 ft. long. The green flowers are devoid of sepals or petals, consisting only of an ovary and one or two anthers. The dried leaves are used for packing, and for stuffing upholstery, under the name of Ulvamarina.

**Grate** (Lat. *cratis*, hurdle). Grille of cast iron used to support solid fuels during combustion.

The dimensions of the bars and of the spaces between them accord with the nature and size of fuel and methods of draught and firing. Basket-shaped grates designed to burn low volatile anthracite or gas coke in domestic fireplaces have high curved fronts and tapered spaces narrowing downwards from the top. Hollow water-cooled firebars, and solid grates arranged to rock for ash removal, are both used in central heating. Grates of cast iron, in steam boilers, withstand high temperatures and delay growth and wastage. Steam generators are often fitted with moving chain grates resembling endless belts; these carry burning fuel continuously towards the back of the combustion chamber, and reject remaining ash as each bar turns round the rear roller. Firebars are commonly cooled by jets of steam or sprays of atomised water under the grate.

**Gratian** (A.D. 359-383). Roman emperor. Flavius Gratianus Augustus in 375 succeeded his father, Valentinian I, with whom he had already been associated in the government of the western empire since 367, but a section of the army insisted on his four-year-old half-brother, Valentinian II, sharing the throne. Gratian was an unwarlike youth, quite unfitted to deal with the barbarian peril.



Grass Tree. An Australian tree with long flower-stems, a head of which is shown inset

Pressed from the east by the Huns, the Goths crossed the N.E. frontier, and in 378 won the battle of Adrianople (q.v.).

Valens, the emperor of the east, having fallen in the battle, Gratian invited Theodosius I to succeed him. Both rulers were under the domination of S. Ambrose, which led to the prohibition, enforced with great severity, of pagan and heretical worship throughout the empire. In 383 Maximus was proclaimed emperor by the troops in Britain, and Gratian was murdered by his own soldiery, at Lyons, Aug. 25 in the same year.

**Gratian** OR GRATIANUS, FRANCISCUS (c. 1100-c. 1150). Italian jurist. He entered a Benedictine monastery and as a monk spent his life. He is known solely for his legal work, the Decretum Gratiani, regarded as the foundation of canon law. According to some accounts, he was at the time of his death, bishop of Chiusi. See Canon Law.

**Graticule**. Scale or design etched or photographed on to a glass or other plate for use in an optical instrument for purposes of measurement.

**Grattan**, HENRY (1746-1820). Irish orator and statesman. Born in Dublin, July 3, 1746, the son of the recorder, he was educated at Trinity College. He was a student of the Middle Temple, London, but spent most of his time listening to speeches in the houses of parliament and practising oratory. In 1772 he was called to the Irish bar, and in 1775 was nominated to represent Charlemont in the Irish parliament by the owner of the borough, Lord Charlemont.

Grattan soon became the leader of the popular or patriot party. Supported by the Irish volunteers, he procured, in 1782, the passing of legislation which made the Irish parliament independent. A rupture between Grattan and Flood (q.v.) then occurred, the former believing that England had given sufficient evidence of her recognition of Irish legislative independence, and that there was no longer a need for the retention of the Volunteers; Flood, on the other hand, continued to clamour for more complete renunciation of English authority.



After F. Wheatley, R.A.

Grattan won, but his success, coupled with his failure to procure Catholic emancipation, saw the beginning of the decline of his popularity. He continued with unabated vigour to speak for the popular cause, attacking the pension list, the sale of peerages, and the purchase of seats in the house of commons, pleading for the amelioration of the lot of the peasants, and for commercial equality between England and Ireland, and opposing vehemently the constant suggestions of a union. In 1794 he supported the government on the question of the war with France, but in 1797 protested strongly against Gen. Lake's proclamation of martial law for Ulster.

Though so ardently devoted to the side of liberty, Grattan showed no sympathy with the movement of the United Irishmen, and in 1798, when their rebellion broke out, he went over to England. From 1806 until his death he represented Malton and Dublin in the British parliament, his chief interest being to secure emancipation for Roman Catholics. He died in London, June 4, 1820, and was buried in Westminster Abbey. Grattan was a man of fine character, disinterested and patriotic, but his reputation is chiefly that of the greatest Irish orator. Fox called him the Irish Demosthenes. His speeches were published in 1822, and there are biographies by his son Henry, 1839-46, and J. G. McCarthy, 1886.

**Gratuity** (sum Lat. *gratuitas*, a free gift). Sum of money given without demand for services rendered, but for which the recipient has no legal claim: a present or donation. Examples are the tip given to a servant or attendant, or the bonus awarded by a firm to its employees.

Every man and woman who served in the British armed forces or civil defence during the First and Second Great Wars was granted a gratuity according to length of service and rank. Women's gratuities were two-thirds of the corresponding male rate. Gratuities were additional to any service or disability pension. In the event of death on active service the appropriate gratuity, up to the time of death, was paid to the next of kin.

**Grätz**, HEINRICH (1817-91). A German historian. Born of Jewish parents at Xions, Posen, Oct. 31, 1817, he resolved to champion the cause of orthodox Judaism, studied at Breslau university, and in 1870 became professor. His reputation had been established

with the first volumes of his *History of the Jews*, 1853-75, Eng. trans. 1889-95. In this celebrated work he expressed radical views on Biblical history, but its 11 vols. are recognized as the standard treatment of the subject. Grätz died at Munich, Sept. 7, 1891.

**Graudenz**. German and historic name of Grudziadz, a town of Poland. Once a strongly fortified German town in W. Prussia, it lies on the right bank of the Vistula, 45 m. N. of Thorn (Torun), and is commanded by a citadel built by Frederick the Great. The principal manufactures include machinery, flour, and tobacco. Graudenz fell to Poland in 1466, to Prussia in 1772. Early in the First Great War it was threatened by the Russians, but was saved by troops hastily sent across Germany from the W. Incorporated in re-born Poland, 1919, in the Second Great War it was captured by the Germans early in Sept., 1939, and by them converted into a "hedgehog" position. It was re-taken by the Russians, March 6, 1945, after a siege lasting a fortnight.

**Graun**, KARL HEINRICH (1701-59). German composer. Born at Wahrenbrück, in Prussian Saxony, May 7, 1701, he began his career in opera at Dresden. About 1735 he made the acquaintance of Frederick the Great, then crown prince, and was attached to the court until his death in Berlin, Aug. 9, 1759. For his patron he composed operas and cantatas and a *Te Deum* to celebrate the battle of Prague. He is best known by his cantata, *The Death of Jesus*, 1755, which for over 100 years was performed throughout Germany during Passion Week.

**Grauwacke**. Alternative spelling of the name of the coarse sandstone Greywacke (*q.v.*).

**Grave**. Name for a place of burial. It comes from an Anglo-Saxon word, and from it have come the compounds gravestone, graveyard, gravedigger, etc. See Archaeology; Burial; Burial Acts; Burial Customs; Cemetery; War Graves.

**Gravel**. Accumulation of worn rock fragments, formed by the action of the sea, by rivers, or by glaciers. The constituents of gravel, which may be formed from nearly every type of rock, vary in size from a walnut to a pea. Larger fragments are known as shingle, smaller as sand. By infiltration of silica, lime, or iron oxides the gravel fragments may become cemented together and are known as conglomerate (*q.v.*). The

chief use of gravel is for the construction of roads and paths, that which is rich in oxide of iron being preferred for its warm colour. Gravel also makes concrete aggregates. Shell gravel, as its name implies, consists chiefly of shell fragments, and is extensively used for pathways. Artificial gravels are used in road-making on account of the scarcity of good binding natural gravel, and are made by crushing granite, quartz, slag, etc., to the required size.

**Gravel**. Popular name for the small stones or calculi which may form in the renal tract, gall bladder, etc., and which are small enough to find their way through the ducts of the organs in which they occur.

**Gravelines**. Town and seaport of France, in the dept. of Nord. It stands on the Aa, about 1 m. from its mouth and 15 m. W.S.W. of Dunkirk. The port has a harbour on the river, but the accumulation of sand therein is a drawback to it. It is a fishing centre, many of the fisherfolk living in Les Huttes, a part of the town almost reserved for them, and has a trade in timber, coal, etc. There are several other industries, including sugar refining, while fish and food preserving are carried on. Gravelines retains its old walls. About 1250 a count of Flanders canalised the river Aa, and here the town grew up. *Pron.* Grav-leen.

**Gravelines, BATTLE OF**. Fought July 13, 1558, between the French on the one side and the Spaniards and English on the other. Philip II of Spain had persuaded his wife Mary of England to join him in making war on France. Two small armies met outside Gravelines, the Spanish having English help in the shape of a fleet, under Lord Clinton, cruising along the coast. The French were charged by the Flemish cavalry under the count of Egmont, while the guns of the ships assisted in their discomfiture. The result was their defeat and the consequent treaty of Cateau Cambresis.

**Gravelotte**. Village of Lorraine, now in the French dept. of Moselle, 6 m. W. of Metz. It was the scene of a battle in the Franco-Prussian War on Aug. 18, 1870, between the Germans under von Moltke and the French under Bazaine. As the French army of 100,000 was driven by the German force of 150,000 into Metz, this was a strategical victory for the latter, who turned the French right flank and prevented a movement W. on Verdun.

The Germans suffered 20,000 casualties and the French 13,000.

's **Gravenhage**. See Hague, The.

**Graves**. Wine produced in the Graves district of Gironde, France. It is dry, light, and more alcoholised than claret, with a distinctive flavour imparted by the gravelly soil. Graves may be white or red, though in England the name is usually associated with the white variety. *Pron.* grahv.

**Graves, THOMAS GRAVES, 1ST BARON** (c. 1725–1802). A British sailor. He entered the navy young, served in the expedition to Cartagena, 1741, and was present at the battle off Toulon, 1744. In 1759, after service in Africa and the English Channel, he fought under Rodney at the



1st Baron Graves,  
British sailor  
After Northcote

bombardment of Le Havre. Promoted rear-admiral in 1779, in 1780 he sailed to America and in 1781 took part in the battle of Chesapeake Capes, and became commander-in-chief of the station.

His actions, especially his failure to relieve Cornwallis when besieged at Yorktown, caused much discussion, but he was promoted vice-admiral in 1787 and in 1788 was made commander-in-chief of Plymouth. In 1794 he became admiral, and for his conduct in the battle of the First of June was made an Irish peer and granted a pension of £1,000. He died Feb. 9, 1802.

**Graves, ALFRED PERCEVAL** (1846–1931). British author. Born in Dublin, July 22, 1846, a son of the bishop of Limerick, after graduating at Dublin he entered the Home office, and was an inspector of schools, 1875–1910. He began his literary career at 14, with a Christmas Ode in a Liverpool



A. Perceval Graves,  
British author  
Elliott & Fry

paper. Father O'Flynn, the poem by which he was first known, appeared in *The Spectator* in 1872, but was not published as a song until 1882, when it came out in a collection of Irish songs arranged by Stanford. Other works by Graves are *The Irish Song Book*, 1894; *The Book of Irish Poetry*, 1915; and an autobiography, *To*

*Return to All That*. He was a founder of the Irish Literary Society, of which he was twice president, and of the Folk Song Society, and a leader of the Celtic revival in Ireland. He died Dec. 27, 1931.

**Graves, CHARLES LARCOM** (1856–1944). A British writer. Younger brother of the above A. P. Graves, he was born Dec. 15, 1856, and educated at Marlborough and Christ Church, Oxford. After association with *The Globe* and *The Cornhill Magazine*, he was assistant editor of *The Spectator*, 1899–1917. He was from 1902 a regular contributor to *Punch*, of which he became assistant editor in 1928. He collaborated often with E. V. Lucas in the writing of humorous squibs and burlesques. He also edited Mr. Punch's *History of Modern England* and Mr. Punch's *History of the Great War*. Apart from humorous verses, e.g. *The Blarney Ballads*, 1889, he published biographies of musicians, e.g. *Grove*, 1903, and *Parry*, 1926. Graves died April 17, 1944.

**Graves, CLOTILDE INEZ MARY** (1864–1932). British author. Born at Buttevant, co. Cork, June 3, 1864, she studied art, and then, turning to the drama and literature, in 1910 won popularity under the name of Richard Dehan with *The Doctor*, a realistic story of life in S. Africa during the war of 1899–1902. She followed this success with *Between Two Thieves*, 1912; *The Man of Iron* (Bismarck), 1914; *The Sower of the Wind*, 1927. She died Dec. 3, 1932.

**Graves, GEORGE** (1876–1949). British comedian. He was born in London, Jan. 1, 1876, made his professional début in 1896, and two years later appeared in London. His reputation as a leading musical comedy "funny man" was established in the provinces when he toured in *The Runaway Girl*, *The Geisha*, and *Florodora*. In London his first big success was in *The School Girl*, 1903, but his outstanding performance was as Popoff



George Graves,  
British comedian

in *The Merry Widow*, 1907. For years he was chief comedian in Drury Lane pantomimes. He appeared in *Me and My Girl*, 1937, and a revival of *The Merry Widow*, 1943. He published reminiscences, *Gaieties and Gravities*, in 1931. He died April 2, 1949.

**Graves, ROBERT RANKE** (b. 1895). A British writer. A Londoner, son of A. P. Graves, and great-nephew of Ranke, he was educated at Charterhouse and St. John's College, Oxford. He established his reputation with the autobiographical



Robert Graves,  
British writer

*Goodbye to All That*, 1929 (relating to the First Great War). I. Claudius, an historical reconstruction, won the Hawthornden and James Tait Black prizes in 1934, and had an immediate sequel, *Claudius the God*. Count Belisarius received the Stock prize in 1939. Other publications included *Sergeant Lamb of the Ninth*, 1940; *Wife to Mr. Milton*, 1943; *The Golden Fleece*, 1944; *The Power of the Dog*, 1945; *King Jesus*, 1947; *Adam's Rib*, 1955; and collections of poems.

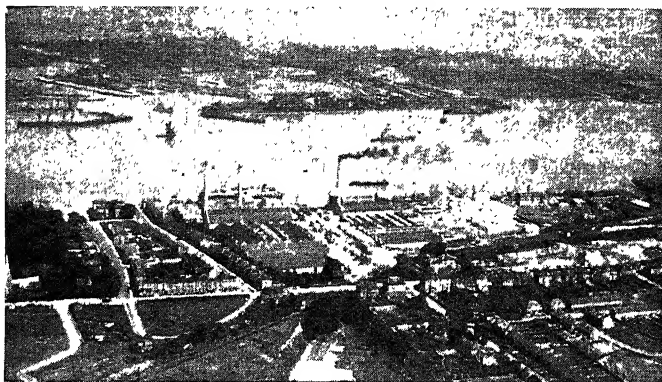
**Graves, SIR THOMAS** (c. 1747–1814). British sailor. Entering the navy, he served in the Seven Years' War, and in 1773 sailed to the Arctic seas under Captain Phipps. The following year he went to America, where he was employed in the prevention of smuggling. In 1779 he commanded a sloop, and was in the battle of Chesapeake Capes, 1781, of St. Kitts, 1782, and of Dominica in the same year. In 1800 he was given a command under Lord St. Vincent, and the next year was promoted rear-admiral, sailing to the Baltic under Sir Hyde Parker. He was Nelson's second in command at the battle of Copenhagen and was knighted for his services. From 1812 he was an admiral.



Sir Thomas Graves,  
British sailor  
After Northcote

**Graves' Disease**. Another name for Exophthalmic Goitre (q.v.).

**Gravesend**. Municipal borough, river port, and market town of Kent, England. On the right



Gravesend, Kent. The works of the Imperial Paper Mills, Ltd.

bank of the Thames estuary, 24 m. by rly. E. of London, it is opposite Tilbury, with which there is ferry communication, and is a Green Line terminus. It is a customs and pilot station, and a port under the Port of London Authority. The market,



Gravesend arms

owned by the corporation, has existed since the close of the 13th century. Gravesend is the home of many river pilots and boatmen. There are two piers. The frontage of the Imperial Paper Mills is directly on the river, and there is a jetty opposite the main entrance, so that ocean steamers can unload their cargoes of wood pulp within a few feet of the paper-making plant. The Fort House was destroyed in the Second Great War.

Gravesend has a history going back to pre-Norman times. In 1380 the town was partly burnt by the French, and it shared in the Wat Tyler rebellion. George I was welcomed here on his accession to the throne, and Edward VII, when prince of Wales, landed here with his young bride, Alexandra. Gravesend's first charter is dated 1632, but various deeds and royal grants are older. The church of S. George is preserved (since 1952) as a chapel of unity in memory of the American Indian Princess Pocahontas (*q.v.*) who is buried there. Rosherville Gardens, 1 m. to the W., were at one time a popular resort for Londoners.

Bargebuilding, brewing, and shrimp fishing are among the industries, while vegetables and fruit are grown in the surrounding districts. Gravesend gives its name to a county constituency. Market day, Sat. Pop. (1951) 45,043.

**Gravimetric Analysis.** Method of obtaining the constituents of any substance by weighing, as distinct from volumetric analysis, which obtains them by consideration of the cubical contents.

**Gravina.** City of Italy, in the prov. of Bari. It stands on an eminence on the left bank of the

Gravina, 29 m. direct and 63 m. by rly. S.W. of Bari. Over 1,000 ft. above sea level, it possesses a 15th century cathedral, a castle of the Emperor Frederick II, afterwards belonging to the Orsini, Dukes of Gravina, and medieval walls and gateways rise above the town. Besides Santa Sofia, there is a rock-hewn church, with ancient paintings. In the vicinity are prehistoric tumuli, and a castle of the Hohenstaufen. Pop. (1951) 29,905.

**Gravina, FEDERICO CARLOS** (1756–1806). Spanish naval officer. Born at Palermo, Sicily, Sept. 12, 1756, he was educated at the Clementine College, Rome, and in 1775 became an officer in the Spanish navy. He served in a frigate at the siege of Gibraltar (1779) and against the British in the W. Indies and S. America. He was in command of the Spanish squadron of the fleet defeated by Nelson at Trafalgar. Severely wounded in the action, he managed to return to Spain, dying at Cadiz, March 2, 1806.

## GRAVITATION: A PROPERTY OF SPACE

Hyman Levy, D.Sc., Prof. of Mathematics, Imp. Coll. of Science

*An explanation of the Newtonian law of gravitation, and of the modification of it due to deductions by Einstein, by which it was made to harmonise with physical facts previously unexplained.*

*See also Einstein; Matter; Newton; Relativity, etc.*

Gravitation (Lat. *gravitas*, weight) may be explained in the following manner: If a piece of material, say a mass of lead, be suspended from the end of a spring, the latter is stretched just as if a pull or force had been exerted on it. Therefore the mass transmits this force to the spring. If the lead is released, it falls to earth with a definite acceleration just as if a force were pulling it downwards. This force, equal to the pull on the spring, is called the gravitational attraction between the earth and the mass of lead.

Irrespective of the nature of the material, equal masses would be those that stretched the spring by the same amount. Two such masses together would therefore stretch a spring by double the amount, and so the total gravitational pull would also be doubled. This is one part of the general law of gravitation which says that the attraction between two bodies is proportional to the number of units of mass in each of the attracting bodies.

The other part of the law can be seen in this way. If the spring, with lead attached, be carried to a point more remote from the earth, say to the top of a moun-

tain, the extension of the spring is decreased, showing, therefore, that the gravitational attraction between earth and lead has also diminished. According to what rule is the attraction between two bodies reduced as they are drawn farther and farther apart? Evidence on this is found in a study of the motion of the planets round the sun. These bodies move in ovals (ellipses) with the sun at the focus. By mathematical means Newton showed that the orbit or route of a planet will be such an ellipse only when the attraction between the two bodies falls off inversely as the square of the distance. This means that if the distance between them be doubled, the gravitational force will be reduced to one quarter; if trebled it will be reduced to one-ninth; and so on. The Newtonian Law of Gravitation states that the force of attraction between two bodies is along the line joining them and is proportional to the product of the masses and inversely as the square of the distance apart.

The discovery of this law brought together a whole variety of diverse phenomena in nature into a single rational picture. Not only did it simplify the complex

motions of the planetary system into one scheme; it made it possible to predict the presence of a previously undetected planet, in the effort to explain the fact that deviations from the simple ellipse were occurring in the orbit of Uranus. The discovery of Neptune revealed the source of disturbance. Here is illustrated a principle of scientific method whereby an induction or generalisation drawn from past experience is used to deduce or predict a new occurrence and so to stimulate experiment in the effort to verify the deduction.

Again, the explanation of tidal phenomena followed at once from the law of gravitation, for under the attraction of the sun and the moon the waters on the earth would tend to be heaped up or drawn out from the surface, so that, as the earth rotated, high tides would appear at these points of heaping. When the sun and moon were so situated that they combined their attractive effects on the waters of the earth, spring tides would result, and when they tended to neutralise each other, neap tides would occur.

#### Problems of Gravitation

Firmly established as the law of gravitation was, it nevertheless stood in peculiar isolation from all corresponding phenomena. In some mysterious way it operated across the empty space between bodies, and seemed to require no medium for its transmission. It did not have a "speed of action" like the speed of light or of electromagnetic waves; it acted instantaneously. It could not be deflected or shielded by any barrier, though one could erect a shield or insulator against electrical or magnetic force. The law, moreover, was deficient in certain respects; for example, the planet Mercury showed a progressive change in its orbit which defied all explanation in terms of gravitation. In spite of its success the law was basically unsatisfactory.

The solution of the mystery came almost as a by-product of another branch of physical science. Early in the 20th century scientists were faced with the inescapable fact that the speed of light, as measured by an observer on the earth's surface, is always the same whether the earth is moving towards the light source or away from it. This contradicted the most elementary preconceived notions of time and space. It was as if the speed with which a train appeared to approach an observer was independent of whether he

were approaching or receding from the train. Preconceived notions assumed that time and space were independent features of nature, and that the geometrical properties of bodies in this physical space were consistent with Euclid's propositions.

#### Newton's and Einstein's Laws

Einstein, in two important pronouncements in 1905 and in 1920, broke away from these assumptions, and, starting with the experimental fact that the speed of light was constant to all observers irrespective of their motion, showed that one was led to a linked space-time unity with such geometrical properties that bodies moving freely in each other's presence followed natural paths corresponding to the actual paths of the planets. Thus the geometry of physical space was such that masses moved as if they were attracted to each other according to a law closely akin to Newton's. Einstein's modified gravitational law satisfied all the known experimental facts, resolved the difficulties associated with Mercury, and enabled scientists to make other predictions concerning the behaviour of light which have since been verified. He removed the law of gravitation from its anomalous position, reducing it virtually to a property of physical space. In Feb., 1950, he published a further generalisation of his theory of gravitation to take in also the electro-magnetic forces covered by his unified field theory of 1929.

**Gray, DAVID** (1838-61). British poet. Born near Kirkintilloch, Dunbartonshire, Jan. 29, 1838, the son of a hand-loom weaver, he was educated at Glasgow university. In 1860 he came to London with Robert Buchanan. He died Dec. 3, 1861, of consumption, developed from a cold caught from spending his first London night in Hyde Park. His best work is his sonnet sequence, *In the Shadows*.

**Gray, ELISHA** (1835-1901). An American inventor, born at Barnesville, Ohio, Aug. 2, 1835. In 1867 he brought out a patent for an improved telegraph apparatus, and nine years later filed specifications for the telephone, which he claimed as his own invention. The U.S. supreme court, however, awarded the patent to A. G. Bell. Gray died Jan. 21, 1901.

**Gray, THOMAS** (1716-71). British poet. Born in London, Dec. 26, 1716, the fifth child and only survivor of twelve, he was educated at Eton, where he was a school friend of Horace Walpole.

After four years at Peterhouse, Cambridge, where he went in 1734, Gray accompanied Walpole on a three years' tour of the Continent. The scenes of travel made a deep and lasting impression on Gray's mind, though the end of the tour was marred by a quarrel between the two friends, each returning home alone. Shortly afterwards, in 1742, Gray went back to Cambridge to resume the classical studies he loved, and in Cambridge, first at Peterhouse and afterwards at Pembroke, he made his home for the rest of his life, save for brief periods, as, for instance, when he visited Scotland in 1765.



After J. G. Eecard in the Nat. Portrait Gallery

In 1757 he was offered but declined the poet laureateship, and in 1768 became professor of modern history at Cambridge.

Apart from translations from the classics, Gray's first poem was the *Ode to Spring*, followed by the *Ode on a Distant Prospect of Eton College* and the *Hymn to Adversity*; all these appeared in 1742. In 1747 appeared the *Ode on the Death of a Favourite Cat*, an earnest of his renewed friendship with Walpole, to whom the cat belonged. Three years later came the *Elegy Written in a Country Churchyard*. The inspiration came from the churchyard at Stoke Poges (*q.v.*), and the poem, made familiar by many quotations, is one of the most beautiful and exquisitely finished ever written. Other well-known poems are *The Progress of Poesy*, 1754, a magnificent piece of work written in the so-called Pindaric metre; *The Bard*, 1757; *The Fatal Sisters*, 1768; *The Descent of Odin*, 1768. The two last were the fruits of the Norse and Icelandic studies which occupied his later years.



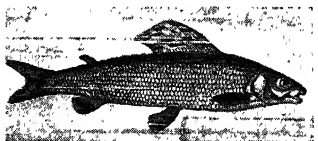
Very small in quantity, Gray's work is that of a consummate artist. Though influenced by the prevailing 18th century conventionalism, he shows a depth of thought and feeling notably absent from most contemporary poetry. Temperamentally shy and reserved, and of melancholy disposition, he was capable of sincere friendship with the few who could appreciate his real nature.

Gray died at Cambridge, July 30, 1771, and was buried in Stoke Poges churchyard. A monument to him consisting of a large sarcophagus was erected in 1799 by John Penn in a field adjoining the churchyard, and in 1918 a tablet was unveiled on the wall of 39, Cornhill, London, his birthplace. There are busts of the poet at Eton and at Pembroke College; much of the latter was rebuilt 1880-81 out of a building fund started in his honour in 1776. There is also a monument to his memory with a medallion portrait in Westminster Abbey.

J. McBain

**Bibliography.** Lives, E. Gosse, 1903; R. W. Ketton-Cremer 1955; Life and Letters, W. Mason, 1774; G. and his Friends, D. C. Tovey, 1890; Thomas Gray, Scholar, W. P. Jones, 1938; Two Quiet Lives, Lord David Cecil, 1948.

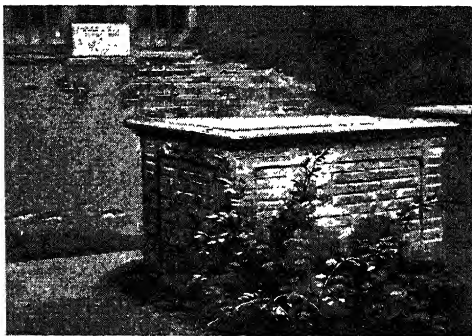
**Grayling** (*Thymallus vulgaris*). Fish of the salmon family. It is fairly common in English rivers,



Grayling. A British fresh-water fish of the salmon family

and has found its way to Scotland but is absent from Ireland. Easily recognized by its large and many-rayed dorsal fin, it occasionally attains a weight of 4 lb., and is a good table fish.

**Grayling Butterfly** (*Eumenis semele*). British butterfly of heathy and uncultivated lands, found also in temperate Europe, N. Africa, and W. Asia. The wings, which have an expanse of about 2 ins., are smoky-brown in tint, with a broad zigzag ochreous band near the



Thomas Gray. The poet's tomb in the beautiful churchyard of Stoke Poges, near Slough  
Homeland Association, Ltd.

blackish margin. This band bears two white-centred black spots on the forewing and a smaller one on the hindwing. The male is smaller than the female, and the markings are less bright and distinct. The brown-striped, drab-coloured caterpillar feeds upon various wild grasses. See Butterfly colour plate, No. 34.

**Grays.** Locality in Essex, England, part of the urban district of Thurrock (*q.v.*).

**Gray's Harbour.** An inlet in the coast of the state of Washington, U.S.A. The rivers Chehalis, Wishkah, and Hoquiam flow into it. The district, presided over by the twin towns of Aberdeen and Hoquiam, which form virtually a single population centre, is a leading lumber port, and the greatest

plywood producing centre in the world. There is an abundant supply of Douglas fir, spruce, hemlock, and cedar. The bay has also a prosperous trade in fish; salmon, halibut, cod, pilchards, and oysters are caught, and there is a considerable fish canning industry. Aberdeen, which was settled by the Scots, had a pop. (1950) of 19,653, and Hoquiam of 11,123. The latter has an airport. The harbour was discovered by Capt. Robert Gray in 1792.

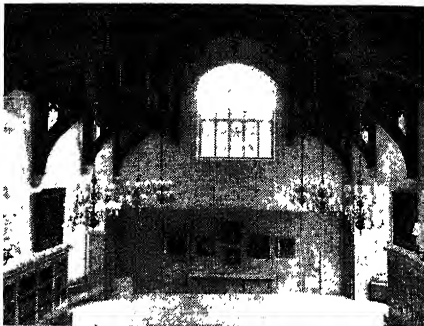
**Gray's Inn.** One of the four inns of court, London. On the N. side of Holborn, with Gray's Inn Road (formerly Gray's Inn Lane) on the E. and Theobald's Road (formerly King's Road) on the N., near the Chancery Lane station of the Central Line,



Gray's Inn arms

it covers 30 acres, on the site of the old prebendal manor of Portpool, town residence of the lords Gray de Wilton, 1315-1505. It passed to the priory of E. Sheen, Surrey, which leased it to law students, and has been a freehold of the Ancient and Honourable Society of Gray's Inn since 1733. Two chancery inns, Staple Inn and Barnard's Inn, were formerly attached. The cognizance of the society is a griffin, which was engraved in a work by Edmund Bunny, The Sceptre of Judah, 1584, inscribed Gryphus Graiensis.

The hall, 1555-60, in which Shakespeare's Comedy of Errors was acted, 1594, narrowly escaped destruction by an incendiary bomb in the First Great War. In the Second, it was destroyed by German air attack on May 11, 1941. The library with much of its contents suffered the same fate. The hall was re-built and opened by the duke of Gloucester on



Gray's Inn, London. The hall, rebuilt after total destruction in 1941. The hammer-beam roof is an exact reproduction of the 16th cent. original

Dec. 5, 1951. On every grand night in the dining hall is honoured the toast To the glorious, pious and immortal memory of Queen Elizabeth I. The walks or gardens, the special glory of the inn, were laid out 1597-1600, according to tradition under the supervision of Francis Bacon, who is said to have planted the famous catalpa tree (*see* Indian Bean), the oldest in England, which may have been brought across the Atlantic by Sir Walter Raleigh. In Charles II's time and later the walks and gardens formed a fashionable promenade.

Bacon had chambers at Coney Court (burnt 1678) during 1576-1626; here he wrote Novum Organum, planned his Garden of the Months, and dated his Essays. He was made a bench 1586, duplex reader 1600, and treasurer 1608. A memorial statue by F. W. Pomeroy was unveiled in South

Square, 1912. Other eminent names associated with the inn are those of Nicholas Bacon, Lord Burghley, Samuel Butler, George Gascoigne, Sir William Gascoigne, Oliver Goldsmith, Sir Thomas Gresham, Samuel Johnson, Archbishop Laud, T. B. Macaulay, Sir Samuel Romilly, James Shirley, Sir Philip Sidney, Robert Southey, and Archbishop Whitgift. Within the Jacobean gateway, in Holborn, Jacob Tonson had a bookshop. Dickens was clerk to a firm of attorneys in Gray's Inn. The Inn was noteworthy for its rookery until the birds were driven off by carrion crows. Gray's Inn has taken a leading part in the restoration of moots as a means of educating students in the conduct of cases. *Consult* Gray's Inn: Its History and Associations, W. R. Douthwaite, 1886; *Chronicles of an Old Inn*, A. Hope, 1889; *The Moot Book of Gray's Inn*, 1924.

**Gray's Peak.** Summit of the Rocky Mts. in Colorado, U.S.A. Situated about 50 m. W. of Denver, it attains an alt. of 14,341 ft., and is named in honour of Asa Gray (*q.v.*), American botanist.

**Graz** or **GRAZ.** Town of Austria, the capital of Styria. It is situated on both banks of the Mur, here crossed by seven bridges, 90 m. S.W. of Vienna. Graz lies in picturesque surroundings, the original town having grown up round the Schlossberg or citadel. Among notable buildings are the Gothic cathedral (15th century), the parish church with an altarpiece by Tintoretto, and the Renaissance Landhaus. The Johanneum contains many interesting collections and a library of nearly 200,000 volumes. The university, founded in 1573, has four faculties, and normally 2,000 students. Graz is industrially important, with large steel works and rly. shops. Other manufactures are cloth, leather, and paper. Pop. (1951) 226,453.



Graz, Austria. The Haupt Platz or principal square. On the hill behind is the citadel

**Graziani, RODOLFO** (1882-1955). Italian soldier. One of Italy's ablest military leaders, Graziani was largely responsible for the rapidity of the Italian conquest of Abyssinia in 1935-36. Appointed viceroy of Ethiopia, here-linquished the position to the duke of Aosta in 1937, and was chief of the general staff at the outbreak of the Second Great War. Graziani commanded the Italian forces that invaded Egypt in 1940, but after the capture of Tobruk by British troops on Jan. 22, 1941, he was recalled by Mussolini. After the surrender of



Rodolfo Graziani, Italian soldier



Great Barrier Reef. Small portion of this immense reef of coral which stretches for 1,200 miles along the coast of Queensland, Australia

Italy, Sept., 1943, Graziani became minister of defence in Mussolini's republican fascist govt. He surrendered to U.S. troops at Cernobio on Lake Como, April 29, 1945, was imprisoned on Procida, brought to trial in 1950, and condemned to 19 years' imprisonment for collaboration with the Germans, May 1, 1950. He was immediately pardoned in respect of 10 years 8 months of the sentence, and was released Aug. 28, 1950. He died in Rome Jan. 11, 1955.

**Great Adventure, THE.** Comedy by Arnold Bennett, based on his novel *Buried Alive*. It was produced at The Kingsway, London, March 25, 1913, and ran for 673 performances with H. Ainley and Wish Wynne. Ainley

appeared in a silent film version, 1916; and Gracie Fields and Monty Woolley made a film version in 1943, retitled *Holy Matrimony*.

**Great Auk.** *See* Auk.

**Great Australian Bight.** *See* Australian Bight.

**Great Barrier Reef.** Coral reef 1,200 m. long, off the N.E. coast of Australia. It covers an area of 100,000 sq. m., and acts as a vast natural breakwater, the channel separating it from the Queensland coast—10 m. to 30 m. wide—providing a safe sea passage studded with islands, of which Hinchinbrook is the largest. There are numerous deep sea passages across it, opposite which lie important towns (*e.g.* Townsville and Rockhampton), and river-mouths (Burdekin, Fitzroy, Burnett), Raine Inlet being the safest. Pearl and *bêche-de-mer* fishing is

carried on. Captain Cook was the first to cross the reef. *See* Coral Reef; *consult* also Great Barrier Reef, W. K. Saville, 1894; *Wonders of the Great Barrier Reef*, T. C. Roughley, 1943.

**Great Basin.** Interior drainage area of the western U.S.A. It covers nearly the whole of Nevada and parts of Utah, Idaho, Oregon, and California, is bounded W. by the Wasatch Mts. and E.

by the Sierra Nevada and the Cascades, and covers an area of more than 200,000 sq. m. A vast arid region diversified by a series of independent mt. ranges extending from N. to S., its highest altitude approaches 5,000 ft., from which it slopes away to the S. and dips beneath sea level.

Lakes are numerous, and among the largest are the Great Salt Lake and Lakes Sevier and Utah on the E., and Lakes Carson, Walker, Owens, Harney, and Malheur on the W., all saline or drained to salt lakes. The only considerable permanent river within the basin is the Humboldt river which feeds North Carson lake. Where irrigation has been applied the soil is fertile, but the greater part of the region is covered with sparse shrubs or is desert. Much mineral wealth underlies the basin, of which vast tracts are covered with alkali and salt left by evaporation, and several inches in depth, or consist of muddy bottoms covered at times by rainwater, or stony wastes left behind by mountain streams.

**Great Bear.** Popular name of the well-known northern constellation Ursa Major (*q.v.*).

**Great Bear.** Extensive lake of Canada. In the N.W. Territories, it touches the Arctic Circle. It has a length of 176 m., and breadth varying from 25 m. to 46 m.; its area is 11,200 sq. m., and its average depth 270 ft. Frozen over for the greater part of the year, it discharges into the Mackenzie river by the Great Bear river. Fort Franklin is on its shores.

**Great Britain.** Name long used for the island comprising England, Wales, and Scotland, including adjacent small islands. Since the political partition of Ireland the term has sometimes been extended to include the six counties of Northern Ireland, but the correct expression for this area is the United Kingdom of Great Britain and Northern Ireland, commonly abbreviated to the U.K. The term dates from 1604, when James I (VI), announced the union of the crowns of England and Scotland, calling himself king of Great Britain. There was much objection to this style, which was declared illegal by the courts of law, but it persisted. The word had been used previously, but in a looser, more poetic sense, having originated in the desire to distinguish Great Britain from Little Britain or Brittany. *See* Britain; United Kingdom.

**Great Circle.** Line on the earth's surface which lies in a plane through the centre of the earth, or any circle on the earth's surface which divides the world into two equal parts. Thus all meridians of longitude are halves of great circles, but the equator is the only parallel of latitude which satisfies the conditions, since the planes of other parallels do not pass through the earth's centre. The shortest line joining any two points on the earth's surface is on a great circle, hence the ascertaining of great circles is valuable in navigation (*q.v.*). Air navigators may fly by this method when weather and safety factors permit. Distance records are calculated "in a straight line"—actually on a curved great circle.

The great circle through London and Melbourne crosses Calcutta and almost touches Trinidad; that which is the edge of the land hemisphere touches Formosa, Sumatra, and almost touches Japan, Madagascar, and Cape Town.

**Great Contract.** Financial arrangement suggested in 1611, but not carried out, between James I

and the English parliament. It was proposed by Robert Cecil, earl of Salisbury, that James I should surrender the revenue which he raised from his tenants in the old feudal ways, by aids, fines, etc., and should in return receive a fixed sum of £200,000 a year. The commons first offered £100,000 and then agreed to double that amount, but both sides put forward further demands and the bargain was never clinched.

**Great Dane.** Breed of dog, among the largest. There is no definite evidence connecting it with Denmark. It has existed as a hunting dog on the Continent for centuries, and was common in England by 1800, being described in the *Cynographia Britannica* by Sydenham Edwards. Dane dogs should have a minimum height of 30 ins. at the shoulder, weight 120 lb.; bitches 28 ins., weight 100 lb. Sizes considerably in excess of this are quite usual.

The Dane should combine great substance with elegance and grace.



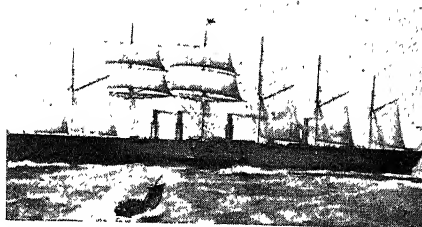
**Great Dane.** A champion specimen

The coat is short, dense, and sleek, of five recognized colours: brindle, fawn of varying shades, blue, black, and harlequin (a white ground with irregular black patches). The Dane has great powers of scent, courage, and an equable temperament.

**Great Dividing Range.** General name of the vast mountain system of E. Australia. It extends from the N. of York Peninsula in Queensland, and trends S. and S.E. to the borders of New South Wales; it then turns S.S.W. through that state and Victoria, terminating at its S.E. extremity. The westerly extension from here is known as the Australian Alps, and also as the Great Dividing Range. The highest summits are found in New South Wales, Kosciuszko (7,328 ft.) and Townsend (7,260 ft.) being the loftiest.

There are several other peaks over 5,000 ft. The various sections of the Great Dividing Range have different names, *e.g.* the Muniong, Macpherson, and Bellender ranges, and the Blue Mountains.

**Great Eastern.** British steamship, built in 1858 from the designs of Isambard Brunel. The largest steamship built to that date, she was first called the *Leviathan*. Her



**Great Eastern steamship on her first voyage to New York, June, 1860**

*From a contemporary drawing*

dimensions were: length 692 ft., beam 83 ft., draught 25 ft., and gross tonnage 18,915 tons. She was a screw and paddle vessel and cost about £750,000. Her builders were Scott, Russell & Co., Millwall.

She crossed the Atlantic in 11 days, 1860, and later laid the Atlantic cable. Later still she laid the French Atlantic cable, the Bombay-Suez cable, and the fourth and fifth Atlantic cables. Sold for £16,000, she was broken up, the materials fetching £60,000. *Consult* The Great Iron Ship, J. Duggan, 1953.

**Great Exhibition of 1851.** *See* Crystal Palace; Exhibition.

**Great Expectations.** Twelfth novel of Charles Dickens. It appeared serially in *All the Year Round*, Dec., 1860-Aug., 1861. Much shorter than most of his novels, it has claims to being his best-told story. It is written in the first person, the supposed narrator being Philip Pirrip, known as Pip; his sad tale of humble origins, sudden promise of fortune, and bitter disappointment conveys a wholesome moral, though Dickens was regrettably persuaded by Bulwer Lytton to exchange his original natural ending for a conventional "happy" one. Of many richly drawn characters the most memorable are the grotesque recluse Miss Havisham, and the simple-hearted and lovable blacksmith Joe Gargery. A British film version of the novel, made in 1946 by Cineguild was popular on both sides of the Atlantic.

**Great Falls.** Second city of Montana, U.S.A., the co. seat of Cascade co. It stands on the

Missouri, opposite the point at which the Sun river flows into it, and 12 m. above the falls which give the town its name. It has copper mines, and gold, silver, lead, and zinc are also worked. The surrounding area is an agricultural and stock raising region, and the town has oil refineries, smelting and electrolytic plants, flour mills, and meat packing factories. Two rlys. and an airport serve it. The Belt mts. are in the vicinity, and Great Falls is near the winter sports centre of Sun Valley. The Lewis and Clark and Jefferson national forests and some of the world's largest hot springs are also near. The city, which was founded in 1883, had in 1950 a pop. of 39,214.

**Great Fire of LONDON.** Fire which lasted four days and nights of Sept., 1666. It broke out about 2 a.m. on Sunday, Sept. 2, near the oven of one Farynor, the king's baker, in Pudding Lane, near London Bridge. A pile of faggots was by the oven, fitches of bacon stood near; the houses in the lane,

one of the narrowest in the city, had projecting storeys, and their woodwork was coated with pitch. Farynor, his wife, daughter, and manservant escaped by the roof, but the maidservant, afraid to risk the climb, was the first victim of the outbreak.

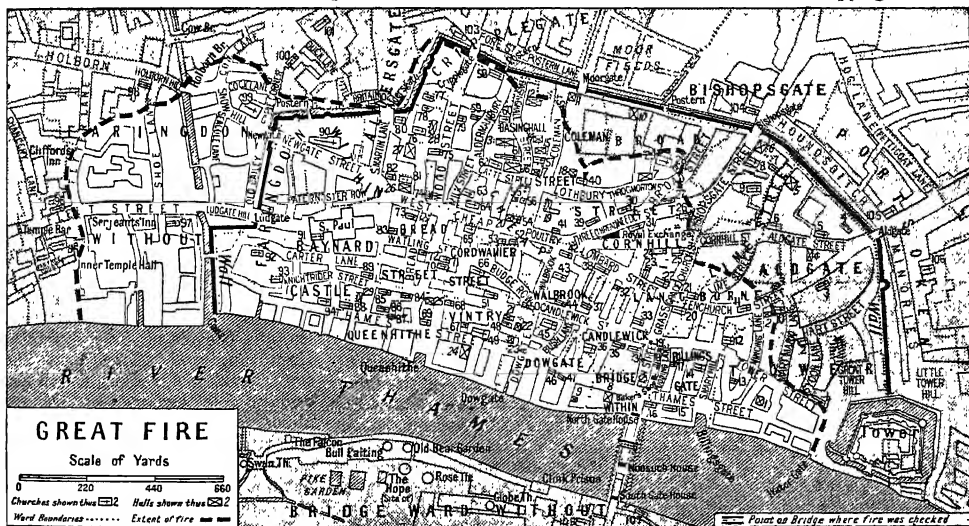
The flames spread slowly until they attacked the cellars and warehouses along Thames side. By 8 a.m. London Bridge was blazing. On Tuesday Cheapside, S. Paul's cathedral, and Guildhall were destroyed. By Thursday morning only a sixth part of the city within the walls was left standing, the liberties west towards Temple Bar were burnt out, 100,000 people were homeless, and nearly all that had remained of medieval London was obliterated, or doomed. So far as is known, however, only about a dozen people were burnt.

The area destroyed within the city walls was 373 acres; without, 63 acres and 3 roods. Not counting S. Paul's and Guildhall, 84 parish churches, 13,200 houses, 44

halls of livery companies, the city gates, Royal Exchange, all the markets except Leadenhall, the gaols, all the Inner Temple except the hall, church, part of Fig Tree Court, and the gateway to Fleet Street perished. Wharves and landing stages and boats and barges were included in the losses, the total extent of which has been estimated at £10,000,000, a sum equal to a least £40,000,000 of modern coinage.

For long the fire was attributed by many to a Papist plot. Now it is agreed that it was due to a strong N.E. wind following a period of extremely dry weather, and the inflammable nature of the buildings. Fire-engines were as unknown as fire insurance, and the blowing up of houses by gunpowder had to be resorted to to stay the flames.

The familiar epigram that the fire began in Pudding Lane and ended at Pie Corner lacks veracity; the fire burnt for 20 hours after Pie Corner had been razed; it ended in the Cripplegate area,



**CHURCHES:** 1, Allhallows Barking; 2, S. Olave; 3, S. Katherine Coleman; 4, Trinity Christ Church; 5, S. Katherine Christ Church; 6, S. Andrew Undershaft; 7, S. Mary; 8, S. Ethelburga; 9, S. Helen; 10, Allhallows Staining; 11, S. Gabriel or Fen Church; 12, S. Margaret Patens; 13, S. Dunstan in the East; 14, S. Mary at Hill; 15, S. Botolph; 16, S. Magnus; 17, S. George; 18, S. Margaret; 19, S. Leonard Milk Church; 20, S. Benet Grass Church; 21, S. Dionys; 22, Allhallows; 23, S. Edmund; 24, S. Michael Archangel; 25, S. Peter Cornhill; 26, S. Martin Oteswich; 27, S. Anthony (French Church); 28, S. Peter le poor; 29, Austin Friars (Dutch Church); 30, S. Bartholomew; 31, S. Benet Pink; 32, S. Nicholas Acon; 33, S. Clement in Eastcheap; 34, S. Michael; 35, S. Martin Orgar; 36, S. Laurence Poulney; 37, S. Mary Abchurch; 38, S. Mary Woolnoth; 39, S. Christopher; 40, S. Margaret Lothbury; 41, S. Mildred; 42, S. Mary Woolchurch; 43, S. Stephen Walbrook; 44, S. Smith; 45, S. Mary Bothaw; 46, Allhallows the more; 47, Allhallows the less; 48, S. Michael Paternoster; 49, S. Martin Vintry; 50, S. John upon Walbrook; 51, S. Thomas Apostle; 52, S. Sythe; 53, S. Pancrate; 54, S. Mary Colechurch; 55, S. Martin Pomary; 56, S. Olave Upwell; 57, S. Stephen; 58, S. Alphege; 59, S. Mary Abchurch; 60, S. Michael Bassishaw; 61, S. Mary Magdalen; 62, S. Laurence Jewry;

63, S. Mary Magdalen; 64, Allhallows Honey Lane; 65, S. Mary Bow; 66, S. Mary Aldemary; 67, S. James Garlick; 68, Holy Trinity; 69, S. Michael Queenhithe; 70, S. Mildred; 71, Allhallows Bread Street; 72, S. John Evangelist; 73, S. Matthew; 74, S. Peter W. Cheap; 75, S. Michael; 76, S. John Zachary; 77, S. Olave Silver Street; 78, S. Mary Staining; 79, S. Alban; 80, S. Anne; 81, Foster (S. Vedast); 82, S. Leonard; 83, S. Augustine; 84, S. Nicholas Olave; 85, S. Nicholas Cole Abbey; 86, S. Mary Mount-haunt; 87, S. Mary Somerset; 88, S. Peter; 89, S. Mary Magdalen; 90, Christchurch; 91, S. Gregory; 92, S. Anne; 93, S. Andrew; 94, S. Benet Hite; 95, Temple; 96, S. Dunstan; 97, S. Bride; 98, S. Andrew; 99, S. Sepulchre; 100, S. Bart. the less; 101, S. Bart. the great; 102, S. Botolph; 103, S. Giles; 104, S. Botolph; 105, S. Botolph; 106, Trinity Minories; 107, S. Olave; 108, S. Mary Overy.

**HALLS:** 1, Bakers; 2, Clothworkers; 3, Ironmongers; 4, Bricklayers; 5, Fleethers; 6, Parish Clerks; 7, Drapers; 8, Fishmongers; 9, Dyers; 10, Carpenters; 11, Armourers; 12, Girdlers; 13, Guild; 14, Weavers; 15, Masons; 16, Bakers; 17, Bay; 18, Founders; 19, Grocers; 20, Mercers; 21, Outlets; 22, Skinners; 23, Innholders; 24, Parish Clerks; 25, Painter Stainers; 26, Saddlers; 27, Goldsmiths; 28, Haberdashers; 29, Blacksmiths.

**Great Fire of London.** Plan of the area affected by the conflagration of 1666, showing the various wards. The solid black line indicates the course of the old city wall, and the broken line the limits of the fire

at Cock Lane. Not until 1668 was the task of rebuilding taken thoroughly in hand.

The Monument opposite Fish Street Hall, erected 1671-77, did not originally contain the ascription of the fire to Popish faction; this was placed upon it in 1681 after the publication of the perjuries of Titus Oates; the words were finally removed in 1830. *See* London; Monument, The; *consult also* The Great Fire of London, W. G. Bell, 1920; and the Diaries of Evelyn and Pepys.

**Great Fish.** Bay or inlet of the Atlantic Ocean. It cuts into S.W. Africa, in lat. 16° 30' S. and long. 11° 48' E. Near the S.W. extremity of Angola or Portuguese W. Africa, it penetrates about 30 m. inland.

**Great Fish.** A river of Cape Province, S. Africa. For many years it formed the boundary of Cape Colony against incursions by the Kaffir tribes on the E. It drains over 12,000 sq. m. and rises in the Sneeuwbergen (snow mts.), receiving the waters of the Graak, Tarka, and Little Fish rivers, and enters the Indian Ocean at Waterloo Bay, between Port Alfred and East London. It is 230 m. long.

**Great Fish.** River of Canada, also called the Back. It rises near the N. shore of Lake Aylmer, N.E. of Great Slave Lake, and, flowing generally in a N.E. direction, discharges into an inlet of the Arctic Ocean after a course of about 500 m. Sir George Back (*q.v.*) explored its banks.

**Great Gable.** Mt. peak of Cumberland, England. It is about 7 m. S. of Keswick and is 2,949 ft. in alt. Dangers attend a rash ascent. Near is Green Gable, 2,500 ft. high.

**Great Harry.** English warship, built by Henry VIII at a cost of

and is considered to mark the beginning of the Royal Navy.

**Great Harwood.** Market town and urban dist. of Lancashire, England. It is situated on the fringe of industrial Lancashire, adjacent to the Ribbles valley and the Bowland country. It is connected by railway with Blackburn (5 m.) and Burnley (8 m.). Staple industry is cotton weaving; other industries are silk, leather, shoe, and food manufacture. Market day, Fri. Pop. (1951) 10,739.

**Greathead, JAMES HENRY** (1844-96). British engineer. Born at Grahamstown, Cape Colony, Aug. 6, 1844, he came to England and studied engineering under P. W. Barlow, who directed his attention to the shield system in tunnelling. This Greathead made use of in the Thames tunnel constructed in 1869. The Greathead Shield (*v.i.*) in 1886 was applied to the construction of the City and South London and other tube rlys. He also invented the Ejector fire hydrant. He died Oct. 21, 1896.

**Greathead Shield.** Tunnelling device mainly invented by James Greathead. It consists of a steel cylinder, stiffened internally, and of a diameter slightly larger than the outside of the permanent lining of the tunnel. About halfway along this steel cylinder, hydraulic jacks are fitted; these push the whole shield forward a short distance—each "shove" about 2 ft.—as often as the miners have dug out enough at the front end to ease its progress. Thus the shield is not a cutting or excavating machine, but a travelling support for the ground outside the tunnel.

After every forward "shove" another short length of permanent lining is erected inside the rear end of the steel cylinder. Thus the tail of the shield is continually sliding forward over the last length of the permanent lining put in under its protection, but it always overlaps the permanent lining. The space of about 2 ins. between the outside of the permanent lining and the outside ground, left behind by the shield as it slides forward, is filled with liquid cement each time the shield is moved. *See* Tunnel.

**Greatheart.** Character in the second part of Bunyan's *Pilgrim's Progress*. He acts as guide to Christian's wife, and slays Giant Despair.

**Great Lake** OR CLARENCE LAKE. Lake of Tasmania, in the co. of Westmoreland. It lies S. of the Great Western Mts., and is 9 m. long and from 2 m. to 3 m. broad.

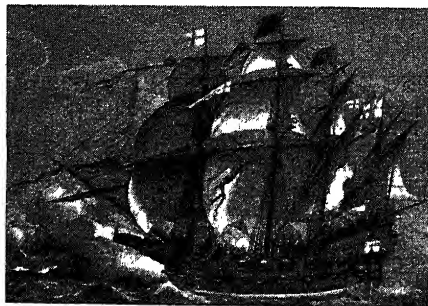
**Great Lakes, THE.** Chain of five fresh-water lakes in N. America. Situated between Canada and the U.S.A., they belong to the basin of the St. Lawrence river, by which they are drained to the Atlantic Ocean. In order of size they are Superior, Michigan, Huron, Erie, and Ontario, and their total water expanse is approximately 94,710 sq. m.

The surface of Lake Superior is 600 ft. above sea level, and between that lake and Erie there is a depression of 28 ft., but between Lake Erie and Lake Ontario there occurs a fall of about 320 ft., chiefly due to the precipitation of the Niagara river over a limestone ledge, which forms the Niagara Falls. The channel serving Lake St. Clair has been increased from its original depth of 9½ ft. to 20 ft., and the Detroit river has been dredged to a depth of 22 ft. The Sault Ste. Marie canal connects Lakes Huron and Superior. Lakes Erie and Ontario are joined by the Welland Canal, which, rebuilt in 1932, admits the passage of vessels drawing 25 ft.

The region surrounding the Great Lakes is one of the most productive in North America, and the cheapness of transport afforded by these waterways has enabled the farming, fruit-growing, and mining industries to be developed on a greater scale. Among the ports served by the lake system are Chicago, Milwaukee, Detroit, Buffalo, Cleveland, Erie, Toronto, Hamilton, and Kingston. The water level of the lakes, which are unnavigable because of ice for about five months in the year, is slowly sinking, and to obviate this dams have been built across the outflow channels. *See* Erie; Huron; Michigan; Ontario; Superior.

**Great North Road.** Highway in Great Britain between London and Edinburgh. Dating from the days of the Roman occupation, this trunk route has been for centuries the principal means of communication between England and Scotland. By ministry of Transport numbering it is A1. Towns through which it passes are Stamford, Grantham, Newark, Doncaster, Darlington, Durham, Newcastle-upon-Tyne, and Berwick-on-Tweed.

Even at the beginning of the 19th century the road was inadequate for the volume of traffic, an



Great Harry. English double-decked warship of 1514

From a picture by Holbein

£14,000. She was the first double-decked ship constructed in England, was of 1,000 tons burthen,





Great Lakes. Map of the great inland seas of the United States and Canada, important as waterways to the surrounding states and provinces, showing canals open and projected

improvement by Macadam being carried out on the S. approach to Barnet in 1825. Telford engineered most of the improvements along the highway, but not until 1933 did the completion of the last section of the North Circular Road link it up with the Great West Road (*q.v.*). On May 6, 1946, the minister of Transport announced a national road programme which included the construction of a number of by-passes on the Great North Road. The story of this ancient highway is told in *The Great North Road*, C. G. Harper, 2 vols., 1901.

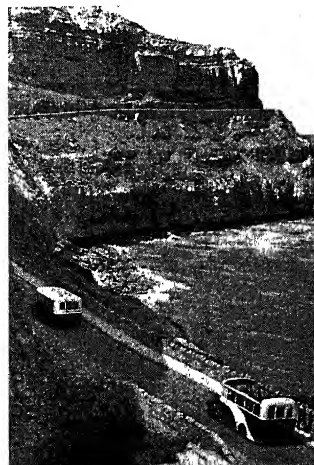
Another Great North Road, traversing E. Africa from Nairobi to Victoria Falls, S. Rhodesia, is part of the Cape to Cairo highway.

**Great Organ.** Manual keyboard of an organ which controls the more solid-toned stops. Where there are two manuals, the great is the lower one; with more than two, it is usually the second from the bottom. *See Organ.*

**Great Orme's Head.** Headland of N. Wales, N.W. of Llandudno at the W. end of Orme's bay. The steep white limestone cliffs, pitted with large caves, are 679 ft. high. At the summit is a small church dating mostly from the 15th century, but with a Norman font. A hotel and a golf

course have been constructed on the headland, and a lighthouse stands at its N. point.

**Great Plague.** Terrible epidemic of bubonic plague which ravaged London and other parts of England in 1665. In 1603 there was an epidemic of plague in which 33,347 persons died in London, and in 1625 there was another in which 41,313 perished.



Great Orme's Head. View of this N. Wales headland as approached by coastal road from Llandudno  
British Council

For the 15 years preceding 1665 London had been remarkably free from plague. It has been said that the infection was brought from Holland, but this is not certain, as there were always a few cases in London. In June the number of deaths became alarming, and there was a steady increase in the mortality until the end of Sept. During the winter the epidemic abated. The number of deaths in London in 1665 was 68,596. At the height of the epidemic the scenes were appalling. The doors of the houses in which the sick lay were marked with a red cross and the words "Lord, have mercy upon us," and no person was allowed to enter or leave these houses.

At first the dead were buried separately and in coffins, but when the mortality was at its worst the bodies were simply thrown into great pits. Besides shutting up the houses, fires were burnt in the streets, as these were believed to have a preventive effect. The exceptional virulence of the epidemic was confined to London and the towns in its immediate vicinity.

The plague lingered on in London through 1666, and its eventual disappearance was probably helped by the Great Fire of that year, which swept away a large area of overcrowded, narrow, and insani-



tary streets. Defoe, in his *Journal of the Plague Year*, published in 1722, gives what purports to be an account of the plague by a contemporary. See *Black Death*; *Plague*.

**Great Powers.** Term applied, especially during the 19th century, to the dominating countries of Europe. Their relations decided the peace of the world. The congress of Vienna, 1814-15, established or confirmed the right of France, Great Britain, Austria, and Russia to be Great Powers, and after its unification in 1870 Italy was added. Towards the end of the century, the influence of Germany, the U.S.A., and Japan in world politics brought them into the list of Great Powers. The shattering of Europe by the two Great Wars left only two Great Powers—the U.S.A. and Russia. See *Balance of Power*.

#### Great Queen

**Street.** London thoroughfare linking Drury Lane with Kingsway, W.C. Named after Queen Henrietta Maria, it was built about 1629, many of its houses being the work of Inigo Jones's pupil Webb. The dominating building is the Freemasons' Hall (see *Freemasonry* illus.) dedicated as a peace memorial 1933, and replacing an earlier building dating from the 18th cent. The disused Kingsway Theatre is on the N. side. Sheridan is said to have written *The School for Scandal* at No. 55; and Joshua Reynolds and William Blake worked here as apprentices.

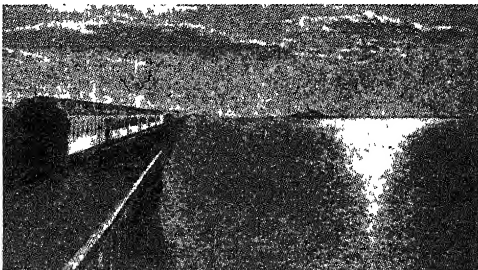
**Great Rebellion.** Name given to the civil war in England which ended in the execution of Charles I in 1649, or, according to another point of view, in the restoration of Charles II in 1660. To the royalists in the time of Charles II, as earlier, the parliamentary movement appeared as a rebellion, and the phrase obtained greater currency when Clarendon called his great work *The History of the Rebellion*. Later, however, it became thought of as a civil war. See *Civil War*.

**Great Rift.** Valley or depression of the earth's surface. It extends from the Lebanon to near the borders of Natal. It is the longest meridional land valley on the earth, being nearly 5,000 m. in length. Beginning in the neighbourhood of the Lebanon range, it

traverses the Jordan and the Dead Sea, the gulfs of Akaba and Suez, and the Red Sea to Bab-el-Mandeb. Then it crosses French Somaliland and Abyssinia, and goes through Lakes Rudolf, Manyara, and Nyasa to Sheringoma plateau, Mozambique.

At the N. extremity of Lake Nyasa the valley branches off N.W. through Lake Tanganyika, and bearing N. and N.E. it reaches Lakes Edward and Albert. From Lake Tanganyika there are S.W. and S. extensions to Lake Upemba and Lake Mweru.

**Greats.** Popular name for certain examinations at Oxford university. Classical Greats is the examination in the honour school of *Literae Humaniores* in Greek, Latin, classical history; Modern Greats is the honours examination in philosophy, politics, and economics.



Great Salt Lake. The Overland Limited or Mormon Express crossing the bridge over the lake

**Great Salt Lake.** Extensive water expanse in Utah, U.S.A. It lies in the N.W. part of the state on the E. side of the Great Basin, is about 75 m. long by from 20 m. to 50 m. broad, and has a mean depth of 20 ft. Its surface elevation is 4,220 ft. above sea-level, and its area, which varies greatly, according to rainfall, was 1,750 sq. m. in 1850; 2,175 sq. m. in 1870; 1,500 to 1,750 sq. m. in 1951.

Naturally salt, its waters contain 20-25 p.c. of mineral salts,

principally sodium chloride, and the production of salt is considerable. The lake is fed by the Bear, Jordan, and other streams, and through the Jordan receives the waters of Lake Utah, but it has no outlet. Its heavy waters do not permit the human body to sink. The existence of the lake was first reported in 1689 by Baron La Hontan. See *Salt Lake City*.

**Great Schism.** Period from 1378 to 1417 during which two rival popes claimed each to be the sole head of the Church. In 1378 Urban VI was elected pope, the papal court having just returned to Rome after its exile at Avignon. Against him the French party elected an anti-pope, Clement VII. In general the former was recognized by all Christendom except France, Scotland, and parts of Germany and Italy under French influence. Each party elected successors on the deaths of the two popes. Various attempts to heal the breach failed. In 1415 the council of Constance met. It deposed the anti-pope John XXIII and received the abdication of Gregory XII, Urban's successor, in 1415, set aside the anti-pope Benedict XIII in July, 1417, and in Nov., 1417, a new pope, Martin V, was elected and recognized by both parties.

**Great Seal.** Emblem of sovereignty, customarily used in some monarchical countries when the will of the sovereign is expressed. There are a great seal of the U.K., and seals for Scotland and Northern Ireland. Formerly a separate official, the lord keeper had charge of the great seal, but its custodian today is the lord chancellor. A new seal is introduced on the accession of a new sovereign or when the old seal is worn out or the design is changed. The old seal is then in theory destroyed; but in practice the sovereign merely gives it a gentle tap with a hammer



Great Seal. Picture of the two sides of an impression of the great seal of James II. The original measures 5½ ins. in diameter

(damasking). A damasked seal belongs to the lord chancellor of the time. James II, before his abdication in 1688, threw the great seal into the Thames. *See* Chancellor; Seals.

**Great Slave.** Lake of Canada, in the N.W. Territories. Its area is 11,170 sq. m., and its shape irregular. It is about 300 m. long and has several bays; the Slave and other rivers flow into it, and the Mackenzie carries its waters to the Arctic.

**Great Smoky Mountains.** Section of the Appalachian system, U.S.A. They extend in a S.W. to N.E. direction between Tennessee and N. Carolina, and attain an alt. of 6,642 ft. in Clingman's Dome.

**Great Wall, THE.** Rampart of the ancient Chinese empire, constructed in the reign of Tsin Shih Hwangti (246–209 B.C.) as a protection against the incursions of the Tartars. It stretches from beyond Lanchow, Kansu province, in the W. to Hopeh province, where it ends within a few miles of the sea at Shanhaikwan, the total length being about 1,400 m. Originally from 20 ft. to 30 ft., with towers 40 ft. to 50 ft. high at intervals of 200 yds., it has crumbled away to a low mud wall in the W., with wide gaps. It is best preserved in the neighbourhood of Peking. *See* China illus. p. 2029.

**Great War, THE.** Name often given to the world conflict of 1914–18, which is described throughout this Encyclopedia as the First Great War, that of 1939–45 being here termed the Second Great War. *See* First Great War; Second Great War; also under the names of particular battles and campaigns of each.

**Great Western Railway.** British railway company, founded in 1835. The original line was constructed between Paddington and Bristol; continuous extensions were made and territory from London to the West of England, South and Central Wales, Birmingham and the West Midlands, Chester, and Birkenhead was later served. The track, originally of 7 ft. broad gauge, was converted to 4 ft. 8½ ins. in 1872–92. The company was the only one of the four main lines to retain its original title under the Railways Act of 1921.



Great Western Railway arms

Its capital in 1947 was approximately £150,000,000 and its total route mileage 3,743. Its h.q. were at Paddington, the London terminus, and principal carriage and wagon works at Swindon. G.W.R. locomotives were painted green and black and passenger vehicles chocolate and cream. A dock system in South Wales was a G.W.R. enterprise. G.W.R. steamer services operated from Weymouth to the Channel Islands; Fishguard to Waterford or Rosslare. During the Second Great War the G.W.R. ran 44,988 trains for the forces and 66,798 government stores trains. The company was nationalised as part of British Railways, Jan. 1, 1948, the system placed under the Western region executive being approximately that of the G.W.R.

**Great West Road.** London arterial highway, constructed in the early 1920s between Chiswick and a point on the London–Bath road W. of Hounslow, a distance of some 5 m. The ministry of Transport numbering is that of the Bath road, A4. For most of its length it has a quadruple track divided by a centre strip. Many light industries have found the vicinity of the eastern sections a convenient site for factories, and the whole stretch quickly became one of the earliest and most notorious examples of ribbon development. Almost opposite its junction with the Bath road a further arterial road, the Great South Western, leads to Staines (A30). In 1937 the ministry of Transport obtained powers to drive a new road connecting Cromwell Road with Chiswick.

**Great Yarmouth.** *See* Yarmouth.

**Greaves** (old Fr. *grève*, shinbone). Armour for the lower part of the legs. Bronze or pewter greaves were worn by the Greeks and Romans (Gr. *knemides*, Lat. *ocreae*). In medieval times they were embossed and ornamented. They were lined with soft material and fastened by ankle rings and straps. *See* Armour.



Greaves. Mailed leg, showing greave between knee and ankle

**Greaves, WALTER** (1846–1930). British painter. Son of a Chelsea waterman and boat-builder, he was greatly influenced by Whistler, and as a youth worked in that painter's studio. He spent most of his life in Chelsea, and his work long remained comparatively unknown. In 1921 he was elected member of the Chelsea Arts club and in 1922 an early work, *Hammersmith Bridge on Boat Race Day*, was purchased by the Chantrey bequest for the Tate Gallery. His Chelsea

Regatta is in Manchester art gallery. Greaves died in poverty as a Charterhouse pensioner, as the result of an accident, Nov. 23, 1930.

**Grebbe Line.** Defensive position in the Netherlands, extending towards the Yssel Meer from the r. Waal. Based on a system of waterways and protected by inundations, the line was attacked by German forces on May 12, 1940. The initial assault was repulsed; but renewed attacks compelled the defenders to withdraw into Holland. In the campaigns of 1945 Canadian troops captured Alpe d'Aren on April 17; and the German forces retreated W. to the Grebbe Line. On May 6 Gen. Blaskowitz, German commander in the Netherlands, surrendered at

Wageningen, near Arnhem, at the S. end of the line.

**Grebe** (*Podiceps*). Genus of diving birds, five species of which occur in Great Britain. They are remarkable for their curiously lobed feet, rudimentary tail, and the backward position of the legs which causes them to assume on land an upright position like a penguin. They frequent ponds and lakes in



Grebe. Great crested grebe on nest among rushes

summer, and some go to the sea in winter. The little grebe is known as the dabchick (*q.v.*).

**Greco, EL.** The nickname (The Greek) given to the Cretan-born painter of the Spanish school, Domenico Theotocopuli (c. 1541–1614), by which he is generally known. *See* Theotocopuli, Domenico.

**Gredos, SIERRA DE.** Mountain range of W. Spain, dividing Old Castile from New Castile and Extremadura. It is a S.W. continuation of the Sierra de Guadarrama, and is about 100 m. long.

# GREECE: IN ANCIENT TIMES AND TODAY

HENRY BAERLEIN, A. D. INNES, M.A., and Others

*Here is a description of Greece today, preceding a full account of its history from ancient times to the period of the Second Great War and after. Articles on Greek Art, Law, Literature, and Religion follow. See also articles on Greek leaders, ancient and modern, e.g. Damaskinos; Metaxas; Pericles; Themistocles; Venizelos; and Greek cities, e.g. Athens; Salonica, etc.*

Greece lies in the S. of the Balkan Peninsula. It has a very long coastline to the Aegean and Ionian Seas, and includes a number of islands in the Aegean Sea and off the coast of Asia Minor.

Its area is 51,246 sq. m., but so much of it is mountainous that it could never support a large population. The mountain ranges, though not very high, divide the country into a number of small districts between which communication is difficult.



Arms of Greece

The sea links the different regions of Greece. There are no navigable rivers; most of those there are dry up in summer. There are many lakes of moderate depth. The former marshy lake Copais in Boeotia was drained and became a very fertile tract of land. There are few forests and little wooded country. The climate is sub-tropical on the lower levels, and subject to extremes of heat and cold in the mountains. How far the present inhabitants are descendants of the ancient Greeks is disputed. The many invasions of the country, both warlike and peaceful, by other races, chiefly Slav and Albanian, have certainly brought in other stocks.

## Modern Expansion

Greece today is a very much larger country than was ancient Greece. As a result of the Balkan wars of 1912-13 she acquired Macedonia, Epirus, Crete, and the Aegean Is. After the First Great War she acquired W. Thrace, and a frontier with Turkey; after the Second, Rhodes and the Dodecanese. Pop. (est.) 7,650,000.

During the latter part of the 19th and beginning of the 20th centuries, many Greeks emigrated, especially to the U.S.A., but immigration restrictions brought the movement to an end. Some 1,500,000 Greek refugees from Turkey, Russia, and Bulgaria settled in Greece between 1918 and 1924.

From 1833 to 1924 Greece was a monarchy, from 1924 to 1935 a republic, then a monarchy

again. There is one legislative chamber, the Boule or chamber, of 354 members elected for four years. There is a council of state with purely judicial functions. The written constitution can be revised as to its non-fundamental provisions by a specially elected revisionary assembly.

The short white kilt (*fustanella*) is still worn by a great many of the peasants, though in the country, as in the towns, the fashion of wearing coats and trousers and hats is spreading. The peasants are mostly smallholders owning their own land. Agriculture in many parts is backward. Only about one fourth of the country is cultivable. The chief crops are tobacco and currants, which are exported all over the world. Olives are grown extensively, and wine is made, mainly for home consumption, the resin in most of it making it unpleasant to those not accustomed to this flavour.

## Food and Communications

Of the cultivated lands half are given up to growing food for the population—wheat, barley, rice, maize. Many peasants eat meat only a few times a year, on festival occasions. What meat there is is lamb; rice as an ingredient of pilaff is very common; marrows stuffed with rice and meat, and in some districts sweetmeats, are usual items in the diet; fruit, especially figs and oranges, is fairly plentiful; wine is drunk everywhere.

Until 1869 there were no railways. Their construction in this mountainous country was costly, but by 1946 there were some 1,700 m. open for traffic. There are good steamer services on the long coast-line.

When the Second Great War began, Greece had a flourishing merchant marine (some 600 ships totalling 1,780,000 tons), which went into the Allied wartime shipping pool; 75 p.c. was sunk.

The chief ports are Piraeus and Salonica (Thessaloniki). Of the Greek towns known to antiquity Sparta is modern and featureless; Thebes picturesque but small and sleepy; Laurium is disfigured by the smoke-stacks and the spoil-banks of mines. Athens and

Salonica are the only centres of population, ancient or modern, which can lay claim to the title of "city."

The Greeks are, as a nation, ever anxious to learn, hungry for education; but the teaching given in the state schools tends to be too literary, though technical schools also exist. Education is compulsory between the ages of 7 and 12.

## The State Church

Among most of the more highly educated religion is either neglected or kept up merely as a form. But among the peasantry attachment to the Greek Church is strong. During the struggles for independence from the Turks and later from the Germans, the heads of the Church were leaders of the nation, a tie that remains though the Church has no direct political importance. It is a state church, Orthodoxy being the state religion. In the monasteries the hospitable entertainment of strangers is traditional. Muslims number about 130,000; their religious leaders are also paid by the state. There are some 35,000 R.C.s.

Both in the villages and in the towns, and also among the Greeks who live abroad, there is a strong love of country. Military service, which is compulsory and universal, is not felt as a hardship. Industrialisation has increased since 1922; there are textile, silk, cement, and other factories, mainly in the Athens-Piraeus area, which, with the mining of iron, magnesite, lead, and other minerals, employed 28.2 p.c. of the pop. in 1939.

ANCIENT GREECE. The history of ancient Greece may be more correctly called the history of the Hellenes. All that was most characteristic of the race was concentrated and consummated in one little state, hardly bigger than the county of Kent; but Hellas, the Hellenic area, covered not only the modern kingdom of Greece, but all the islands of the Aegean Sea and the western coast of Asia Minor; while the Hellenic expansion dominated Sicily, occupied the ports of S. Italy, and planted colonies on the Cyrenaican coast, and as far W. as Massilia (Marseilles) and its offshoots.

Tribes of Indo-European origin made their way into the Greek pen-

insula during the second millennium B.C., mingling with earlier inhabitants. By the 15th century B.C. one group had become dominant in the Peloponnesus and had taken over much of the Cretan culture. This Mycenaean civilization is dimly remembered in the Homeric poems which, however, deal with a later phase when the Achaeans ruled Mycenae. The Hellenes at this era were called Achaeans or Danaans, with Aeolians and Ionians as subdivisions.

In the 12th or 11th century, a ruder Hellenic wave, the Dorian, rolled down from the N.W. The Dorian pressure drove first the northern Aeolians, and then the southern Ionians, to push their way across the islands to the coasts of Asia Minor. It was, however, only in the S., in E. Peloponnesus, and on the Isthmus of Corinth, that the Dorians effected a conquest, destroying the Achaean ascendancy, and then carrying their arms eastwards, across Crete and the southern islands, to the southwestern coast of Asia Minor.

By the year 1000 B.C. Hellas had formed itself: Hellenes were permanently established over the whole Hellenic area—the Greek peninsula, the islands of the Aegean Sea, and the coasts of Asia Minor. The time when the Hellenic name superseded Achaean as the common title of the people is uncertain, but it was manifestly later than the shaping of the two great epics of Homer, who speaks always of Achaeans and Danaans, not of Hellenes. The 7th century was the era of the Western Hellenic expansion into Sicily and Italy, due to the fact that eastward expansion was blocked by political conditions. Powerful non-Hellenic kingdoms were already established in Asia Minor, against which the Hellenic states on the coast could make no advance across the inland hill-country.

#### Geographical Influences

Geographical conditions determined the character of Hellenic political development; on the one hand preventing political unification, and on the other fostering a high degree of organization in the separate political units. Every island was made a natural unit by the sea; hill ranges cut up the mainland into small areas, isolated from each other, generally tending to the evolution of a city forming the centre of an agricultural district which became a political unit where the concentrated life fostered a vigorous political activity. But the Greeks, having no common foe,

had no incentive to union either for self-defence or for conquest, the two great motives to unification.

Nevertheless, they had the common bond of religion and language, and the common characteristics of political development which caused them to feel themselves apart from the "barbarians" who had no share in their religious mysteries, and were politically undeveloped. Thus, under normal conditions, to the Greek the enemy to be suspected was the rival Greek state; the alien was the citizen of a rival state.

In each community the course of political development followed the same lines up to a certain point. From the earliest times each little state consisted of a free population of tribesmen, with their slaves—captives, or earlier peoples conquered in war; all ruled over by an hereditary king, controlled or guided by a council of the hereditary clan chiefs whose families formed an aristocracy, while the people periodically assembled for military or other purposes to confirm or possibly to reject the more important projects designed by their rulers. In course of time in every state except Sparta, which retained the kingship under pecu-

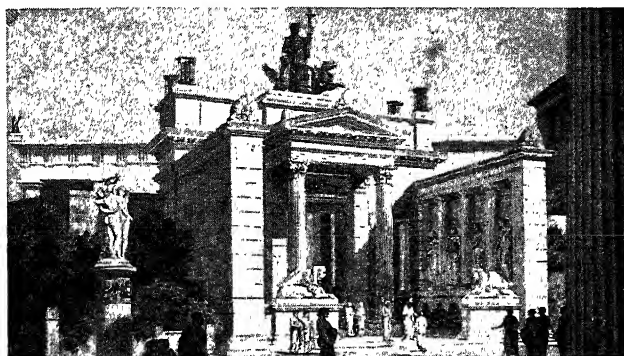
established a dynasty more or less permanent, which rested upon the employment of a paid soldiery. More commonly the second or third generation saw the forcible ejection of the tyrant and the recovery of political control by the old aristocratic families in conjunction with wealthy families from the commons, who established an oligarchy; or else the popular party established a democracy.

The more powerful cities usually exercised a certain dominion over a group of their weaker neighbours, but such a dominion rarely extended over so wide an area as that of an average English county.

Thus, by the 6th century B.C. Hellas was composed of a great number of small city states, most of them independent; though the flourishing and wealthy cities of Asia Minor, while remaining autonomous, had been compelled to acknowledge the sovereignty of the Oriental monarchy of Lydia. The 6th century was, roughly speaking, the age of the tyrants.

#### The Persian Menace

But the second half of this century saw a new portent—the creation of the Persian Empire by Cyrus (*q.v.*), and his successors, Cambyses and Darius (*q.v.*). The



Greece. Imaginary reconstruction of the temple of Demeter, in which the Eleusinian mysteries were celebrated

liar conditions, the monarch lost his hereditary functions, and even if the royal family survived it became absorbed among the other noble houses.

Then came a period of struggle between nobles and commons, usually culminating in the military success of a noble who, having successfully espoused the popular cause, turned his victory to account by assuming a monarchy, shorn, however, of the sacred character originally attaching to the institution. To these monarchs the Greeks gave the name of *tyrannos*, tyrant, or rather absolute ruler. Here and there a tyrant

great empires of the ancient world, Babylonian, Assyrian, or Egyptian, had never touched Europe, and had scarcely penetrated W. of the Taurus Mountains. But now the Persians and Medes from beyond the Euphrates carried their dominion first over the whole of Asia Minor, then absorbed the Babylonian empire, and finally swept into Egypt and subjugated it. The conquest of Asia Minor meant that the Greek cities were included in the great provinces or satrapies organized by the Persian kings; and when Darius crossed into Europe, 513 B.C., and conducted an experimental campaign in the



Greece. Map of the country, showing its boundaries, railways, and chief towns. Inset, map of the ancient divisions and cities of Hellas, with the classical names of the surrounding seas

regions N. of the Danube, Hellas became conscious of the existence of an entirely new menace.

The yoke of Persia was light; she suffered her subject people to rule themselves after their own fashion so long as they paid their tribute and provided contingents to her armies when called upon. Nevertheless, in 500 B.C. the Ionic cities of Asia Minor revolted against their satrap and called upon their kinsmen across the sea to come to their aid. The revolt was crushed; but aid had actually been sent by Athens, while Sparta, acknowledged by the Greek states of the W. as the premier military state, contented herself with threats.

Darius sent envoys to demand from all the Hellenic states "earth and water" symbols of the recognition of Persia's sovereignty.

Many yielded, but Athens and Sparta refused with contumely. The result was that in 490 Darius dispatched an expedition which was to teach the Athenians a lesson, since their active participation in the Ionic revolt had excited his particular indignation. Had Athens elected to submit, or had she been wiped out, the future of the world would in all probability have been entirely changed; but although it was in vain that she appealed to the other Greek states, she had made up her mind to stand for freedom at all costs. The Persian host landed on the plain of Marathon; the little Athenian army, supported by none save the loyal city of Plataea, hurled the Persians into the sea.

The glorious victory of Marathon (490 B.C.) was a complete de-

monstration of the enormous superiority of the Greek armament, discipline, and tactics over those of the Persians; it meant that Greek troops well led could hold their own against Asiatics, in face of almost any odds. Ten years later Xerxes, the son of Darius, having resolved no longer to tolerate the defiance of his power by the insolent Westerns, gathered a vast army and fleet to crush their resistance once for all. But in the meantime Athens, guided by Themistocles, had devoted herself to the development of her fleet, and the other Greek states had realized that they must fight with Athens or perish.

Even then the selfishness of the southern Dorians made them reluctant to advance beyond the Isthmus of Corinth, which could be made impregnable. Still, the fear



that Athens might be compelled to make her own terms, involving at least the withdrawal of her fleet and the exposure of Peloponnesus to attack from the sea, drove the Spartans, to whom the control of the land forces was assigned, to occupy first the northern pass of Tempe, and when it was found that this could be turned, the nearer pass of Thermopylae.

Even then nothing more than the advance guard had been sent, while the forces of the Athenians and their island allies were on the fleets which were engaged in holding the Persian navies at bay. The Greek position was turned at Thermopylae; and Leonidas, having dismissed the major portion of his troops, fell at the head of his three hundred Spartans, winning thereby immortal renown, but not saving Hellas. The Persians overran Attica, but the Athenians drew the fleets of the Barbarians into the great naval engagement in the bay of Salamis (480) where they were annihilated.

Then at last, though again only under threat of the Athenian withdrawal, Sparta prepared for a vigorous offensive against the still vast army which Xerxes yet retained in Greece, an army which was finally and utterly shattered in 479 at Plataea; while the *coup de grâce* was simultaneously administered to the Persian navy on the Asiatic coast at Mycale. At the same time the Hellenes in Sicily under Gela, tyrant of Syracuse, broke another Oriental wave by a crushing defeat of the Carthaginians at Himera in 480.

The importance of these years to the history, not only of Greece, but of the world can hardly be overestimated. They saw the first grand collision between Orientalism and the vital spirit of Western civilization. The triumph of Persia would have turned Athens into another Tyre at the best; the triumph of the Greeks made her the Athens of Pericles, Aeschylus, Sophocles, Euripides, and Pheidias, the mother of Socrates and Plato.

Of all the Greek states, Athens had the most to gain by a tame submission, the most to suffer through a bold defiance whatever the result might be, the most to lose by defeat. She staked all and saved her soul, and thereby saved the soul of Europe. If Persia had won, Greece would have been emasculated, the Oriental tide would have rolled on into Sicily, and Italy, Rome, at that time "mewing her mighty youth" would have been submerged, the very conception of political liberty would have been blotted out. Nor is it to be believed that, if this had befallen, Greek thought and Greek conceptions of art would have attained to anything like that development which during the next century and a half gave the Greeks that supremacy which has ever since influenced the world.

In 490 the great majority of the Greeks probably believed that resistance to the power of Persia was all but hopeless. In 479 the Greek attitude had become altogether



Greece. Traditional costumes. 1. Man from Andravida. 2. Shepherd of Morea in winter coat of straw. 3. Mahomedan peasant. 4. Man from Dimiyizana. 5. Gendarme of Samos. 6. Bride in costume of Patmos. 7. Peasant woman of Morea. 8. Woman of Corinth



different. There was a widespread disposition to follow up the great victories and to strike at Persia herself. For such an enterprise the first necessity was the whole-hearted unity of Hellas. To rout the Persian navy on the sea, and to shatter Persian armies on Greek soil, was one thing; to invade the Persian empire had, so far as the magnitude of the task was concerned, some resemblance to the invasion of Europe from England, with the added complications that would have arisen if every English county had been a separate sovereign state with no central English government.

#### Obstacles to Unity

The difficulties in the way of united action were greater than those of the thirteen American colonies when they opposed themselves to the power of the Mother Country. A real continuous unity of action was only possible of attainment under the direction of one recognized and unquestioned control. Despite what Athens had done, Sparta, not Athens, was the only state to which the rest were willing to concede a priority; but though the Spartan troops were admittedly of the best, Sparta herself was quite unfitted for the task of organizing a united Hellas.

Sparta remained inert and apathetic, and when it was left to Athens to take the lead, continental Greece held aloof, though the maritime states formed the Delian League (*see* Delos) under the Athenian presidency. But a naval league could not do the work.

Before five and twenty years had passed the dream of a war of aggression had in effect faded away, and the Greek states had fallen back into the old attitude of mutual hostilities and jealousies, though with this difference, that they were now grouped roughly either as allies or dependents of Sparta or as allies or dependents of Athens. For Athens, through the Delian League, was founding a sort of maritime empire. At its first formation the states of the league had maintained the navy of the league by providing contingents of ships and men; when they were permitted to substitute money payments, the ships and men were supplied by Athens, so that the navy of the league became virtually the navy of Athens, and the enormously increased power of Athens excited the jealousy of every other state, but especially that of the Spartans.

A further cause of dissension lay in the fact that in almost every Greek state, whether the government was oligarchical or democratic, there existed the two oligar-

chical and democratic parties in fierce antagonism. Oligarchical states favoured Sparta, while democratic states favoured Athens; but the antagonistic party in each state always hoped to effect a revolution with the aid of either Athens or Sparta.

#### The Peloponnesian War

The result was that, nearly fifty years after the Persian *débâcle*, almost all Hellas was involved in the great conflict between Athens and Sparta, which is called the Peloponnesian War. The struggle opened in 431. After ten years it was suspended, the advantage on the whole lying with Athens, whose naval supremacy was unequivocally established; but an ill-judged attempt to extend her imperial sway by a great expedition to Sicily ended in a tremendous disaster. Sparta seized her opportunity to renew hostilities, and though for a long time Athens held her own, a monstrous blunder at last enabled the Spartans to capture or destroy the greater part of her fleet at Aegospotami, and bring the war to a decisive conclusion, with Spartan supremacy completely established in 404.

The next twenty years demonstrated the inherent incapacity of Sparta for political organization; she could not rise above the conception of a Spartan dictatorship, a military tyranny. A new adversary arose when Thebes broke from her sway, and, under the leadership of Epaminondas defeated her armies at Leuctra in 371, and created a brief Theban ascendancy which, however, did not long survive the death of the great captain at the battle of Mantinea in 362.

Athens, though she had recovered much of her old strength, was still in no position to renew her bid for the leadership of Greece. But a claimant for that position now appeared in a quarter which had hitherto been regarded as at best semi-Hellenic. On the N. of Greece lay Macedonia, a loosely organized kingdom which had scarcely passed beyond the tribal system. The royal family, however, claimed a pure Hellenic descent. In 359 the Macedonian crown passed to Philip, who was spending his boyhood virtually as a hostage in Thebes. He returned to Macedon to apply there the political and military lessons which he had absorbed.

With excellent military material ready to his hand, he shaped his Macedonians into a highly disciplined army instead of a loose congeries of clan levies; inter-

vened in the affairs of the Greeks; posed as the champion of Hellenism in punishing for an act of sacrilege the northern state of Phocis, which but for his appearance might have made a successful bid for a military supremacy; and then virtually compelled the whole of Greece not only to recognise Macedon as an Hellenic state, but to acknowledge him as the elected leader of Hellas, the captain of its armies in the revived project of an Hellenic war upon Persia.

The entry of Macedon upon the Hellenic stage was in itself a tremendous revolution, for her organized military resources were more than a match for those of any casual combination of the Greek states. Unlike the Persians, Philip could with his Macedonians apply all that the Greeks knew of the art of war, all that had made them a match for ten times their number of Asiatics. The moment had actually come when under Macedonian pressure Hellas might have been unified as a military empire. But in 336 Philip was assassinated and his crown passed to his son, Alexander the Great, a lad of twenty.

#### Alexander the Great

For a moment the older states thought they could shake themselves free of the new domination; the terrific energy of the young king soon undeceived them. A revolt headed by Thebes was crushed, and Alexander forthwith took up the projected task of hurling the West against the East. In eleven momentous years (334-323) he brought the whole of what had been the Persian empire under his dominion (*See* Alexander the Great), bursting even through the mountain gateways of India; but his mighty career was cut short when he was no more than thirty-three years of age in 323 B.C.

In the midst of his tremendous and unparalleled activities as a conqueror and leader of armies, the genius of Alexander had not failed either to provide temporary organization of his conquests or to indicate the scheme for permanent structure. The barrier between East and West, between Oriental and Hellenic, was to be broken down. The two were to be fused, each giving of its best to the other. Not only in Egypt but in Afghanistan and Turkistan arose cities which took from him the name of Alexandria, cities where Greeks and Macedonians were planted for the diffusion of Hellenic civilization; Greeks were settled even in the Punjab. But his dream of a universal empire

which was to be fused into homogeneity was not destined to be accomplished.

Dying with no son to succeed him, he left the vast dominion to be striven for among his generals, with the result that after a few years it had fallen into five main divisions, in Europe, in Asia Minor, in Egypt, in Syria, and in the remote East beyond the Euphrates. In the four Oriental divisions Hellenism was only an exotic; a foreign influence, an atmosphere which surrounded Macedonian and Greek dynasts, which left its traces but was never absorbed into the soil. And Alexander, failing to fuse East and West, failed no less to fuse Hellas. The Hellas he led was still only a congeries of small states forced into alliance and dominated by Macedon. So it remained after he was gone.

#### Athens and Antipater

Alexander was no sooner dead than Athens took the lead in forming a league—from which as a matter of course Sparta and others stood apart—for throwing off the Macedonian yoke; but, after some initial success against Antipater, the regent whom Alexander had left in Macedonia, in what is known as the Lamian war, the league was virtually dissolved by Antipater's diplomacy. Then followed the period of the struggles for supremacy between Alexander's generals, which finally settled on the Macedonian throne the dynasty of Antigonus in 278.

The last of his rivals was Pyrrhus, king of Epirus; but the career of that brilliant military adventurer, who perished in the contest with Antigonus, had scarcely any influence on the story of Greece. The Macedonian kingdom exercised no recognized authority over the Greek states, though it enforced an effective domination wherever only an isolated resistance was offered. As a matter of fact, Antigonus secured his ascendancy by setting up a *tyrannos* who was a creature of his own in most of the states.

Nevertheless, it was at this stage, about the middle of the third century B.C., that there arose among those minor states which had never claimed a leading position, the conception of a free federation of self-governing states, bound together for purposes of foreign policy. In the Peloponnesian district which still bore the ancient name of Achaea, and in Aetolia, facing Achaea, on the northern side of the gulf of Corinth, arose the Achæan and Aetolian leagues of cities, which began by expelling the tyrants who had been imposed

upon them, and assisting their neighbours to do likewise.

#### Leagues of the 3rd Century

Each of the leagues was organized with what might be called a central federal council with a common commander-in-chief, and one or other was quickly joined by most of the more vigorous cities, though Sparta obstinately stood aloof. Had the Greeks in the day of their greatest glory been able to rise to the conception of an Hellenic federation in which every state would be ready to subordinate its particular interests to the common good, there might conceivably have been a true union and fusion of Hellas. But now it was too late. The leagues were jealous of each other, and Sparta was jealous of both, while both were jealous of Sparta.

Greater Hellas in the W. had never been in close touch with Hellas proper since the episode of the Athenian expedition to Sicily. Then the old struggle with Carthage had been renewed, which in the third century was merged in the struggle between Carthage and Rome. This tremendous contest was brought to a decisive issue in the second Punic War (218–201), which began at the moment when Eastern Hellas was split up between Macedon, Sparta, and the two leagues. Philip V of Macedon, unfortunately for himself, hoped to strengthen his own position by alliance with the Carthaginian Hannibal, which brought down upon him the wrath of Rome as soon as she felt herself free to extend her activities.

#### Greek States and Macedon

The Greek states were divided generally into those hostile to Macedon, and those which favoured her, and individually into parties which followed the same line. But the first result was that Philip was beaten by the Romans, who proceeded to declare the liberation of Greece from the Macedonian yoke (196). But though Rome abstained from assuming a formal sovereignty, it was obvious that her domination had, as a matter of fact, taken the place of that of Macedon, whose king had been made a dependent of the republic.

Rome had rewarded the states which favoured her at the expense of those which supported Macedon; but the one group considered their gains inadequate, while the other considered that they had been robbed. Consequently, as soon as Philip's successor, Perseus, sought to throw off the Roman domination he received moral support from many quarters, though no material aid. He was decisively crushed at

the battle of Pydna, in 168, and Macedon was partitioned into a group of republics. It was natural that Rome should assume a dictatorial tone towards the states whose conduct she felt justified in resenting, and that those states in their turn should resent her haughty attitude. Again the natural results followed—attempted defiance crushed by overwhelming force, and the pronouncement that since the Greeks persisted in misusing their liberty, they must lose it. The last hopeless effort for Greek independence expired with the siege and capture of Corinth, in 146, when Greece was swallowed up in the Roman Empire.

#### Greece and Rome

Greece fell, but in falling, in part at least, conquered the conqueror. The Greek spirit and the Roman spirit were poles apart; but if the Roman had in him something which the Greek lacked, he was nevertheless conscious that the Greek compelled his admiration by some quality in which he was himself deficient, and set himself painfully to the sincere flattery of imitation; an imitation not always discriminating, and not always successful. Roman literature and Roman art became palpably the product of effort to reproduce Greek literature and Greek art, seldom more than half understood.

The Roman formulated his canons from the Greek examples, often without grasping what was fundamental, and what was accidental, thereby creating the classicism by which he himself was hidebound; departing, however, entirely from the essential Romanticism of the Greek in the great days of Greece, when the most vigorous individuality had sought its own expression, and by its triumphant success made individuality thereafter afraid of itself. But if it was in the main, not the spirit of Greece, but the form in which it had clothed itself, that the Roman sought to assimilate, there was yet some infusion even of the spirit which may be felt in the work of the greatest of the Roman poets.

This sketch of the political history of the Hellenes shows how the conditions which fostered an extraordinary and unparalleled vitality in individual communities, actually prevented their fusion into a greater homogeneous political organization, so that they never shaped into a nation exercising an imperial sway over other peoples. The function of Hellenism was not, like that of Rome, to conquer and control the world, but to educate it, and to inspire its ideals.

A. D. INNES

From this time until the beginning of the 19th century, Greece was but a district under alien rule. By conquest it became part of the Roman empire, but except perhaps at Corinth few changes were made by the conquerors. For a time the cities were self-governing as before, subject only to the authority of the Roman governor in Macedonia.

Some of the Greeks assisted Mithradates in his struggle against Rome that began in 88 B.C., while Greece was a battleground in the civil strife in which Julius Caesar was the central figure. Under Augustus and the early emperors conditions were more settled, and this was the age in which Greek thought and culture mainly exercised its powerful influences upon Rome. The province of Achaëa was set up to include most of southern Greece, while steps were taken to form some bond of union between the cities. Hadrian did a good deal for the country in various ways. In the 3rd century Greece was invaded by the Goths, but the Romans drove them out. Later it suffered similarly from the Visigoths. Christianity made slow progress, for the cultured pagans of Athens were less susceptible to it than the northern barbarians.

#### Under the Eastern Empire

When the Roman empire was divided, Greece fell to the eastern or Byzantine portion and the language and influence of Greece were dominant at Constantinople. A succession of invaders entered the land and a number of Slavs settled therein, but on the whole the eastern emperors looked well to its defence. The dispute about the worship of images caused trouble and bloodshed. In the 10th century the Bulgarians invaded Greece, but they were severely beaten in 995. More momentous was the advent of the Normans from Sicily and of the Venetians.

In 1204 the Byzantine empire collapsed and Greece passed to the Latin empire of Romania. That lasted only until 1261, from which date until the arrival of the Turks the country was ruled by Frank and other foreign nobles, first drawn eastward by the Crusades. These rulers, called despots, divided between them most of the country, while the Venetians had a foothold on the coast and islands. None of the dynasties, however, succeeded in establishing themselves firmly, and in 150 years or so the emperor at Byzantium was once more master of Greece. He, however, fell before the Turks in 1453, and a few years after the fall

of Constantinople the sultan conquered almost the whole land.

By the Turk Greece was divided, apart from the islands, into six sanjaks. His rule was arbitrary and at times brutal, but not consistently oppressive. Greece was obviously affected by the series of wars between the sultan and Venice. By 1570 the former had made his mastery complete, but after Lepanto the tide began to turn, and in 1699 the Morea was surrendered to the republic, but it was reconquered in 1715. The rise of the Russian power was the next external event that affected the fortunes of Greece, and this led to freedom from Turkish rule.

The history of Modern Greece begins with the war of Independence, 1821-29, one of the overflowings of national sentiment caused by the French Revolution. It met with general sympathy in Europe. The insurgents were assisted by a British loan; and the transference of the chief naval and military commands to British volunteers, Lord Cochrane (afterwards earl of Dundonald) and Sir Richard Church, helped to bring the long and fluctuating contest to an end. But it was settled only by the intervention of the Great Powers, the U.K., France, and Russia, which first by diplomacy and then by arms assisted the Greeks to establish independence, recognized by the protocol of London, Feb. 3, 1830.

The Bavarian prince Otto, invited to become king of the Hellenes, ascended the throne Jan. 18, 1833; but his despotic methods and his employment of Bavarians only in government offices soon made him disliked, and in 1843 he was forced to grant a constitution and to dismiss his Bavarian advisers. But he neither grew in popularity nor was able to secure good government for the country, which needed above all things a period of rest. Instead it was plunged into political struggles, in which the Great Powers took sides.

#### British Intervention

Twice British warships were sent to threaten Piræus, the port of Athens; the first time to enforce payment of interest on a loan arranged in London; the second time to support the doubtful claims to compensation put forward by a certain Don Pacifico, a Portuguese who called himself a British subject. Again, during the Crimean War, when Greek sympathies flowed towards Russia, foreign warships were sent into Greek waters. This so intensified

the unpopularity of the king that in 1862 he was expelled, and the crown was offered to the duke of Edinburgh. But Britain had agreed with France and Russia that neither she nor they would put a prince upon the throne, so the Greeks had to look elsewhere. They chose the second son of Christian of Schleswig-Holstein (later Christian IX of Denmark), and this prince in 1863 became king as George I.

At first he was warmly welcomed, the more so because Britain took the opportunity to please the Greeks by restoring to them the Ionian Islands which had for a number of years been a British protectorate. But the strife of parties which has always hindered the progress of modern Greece became more and more violent. The king was drawn into it. He was obliged to dismiss his principal adviser, Count Sponneck, a Dane whom he had brought with him; and to agree to changes in the constitution which put the power of control into the hands of a single legislative chamber.

#### Financial Difficulties

There was little difference between the parties which, headed by Tricoupis and Delyannis, followed one another in and out of office for many years. Agitation against the Turks on account of their treatment of Macedonians and Cretans was carried out by a secret society, and in 1897 war broke out. The Greeks were the aggressors and suffered bitterly for their folly.

The Turkish troops were everywhere and at once victorious. The ill equipped and ill trained Greek army was defeated, and the government was obliged to beg the Great Powers to mediate and save Greece from annihilation. The one good result of the war was the liberation of Crete, which became autonomous under a Greek prince.

The only events which broke the monotony of political warfare for some time after this were the murder of Delyannis, 1905, and a revision of the constitution, 1911. But in 1912 came the Balkan War, in which Greece joined Serbia and Bulgaria against Turkey. The successes of her troops brought an addition of some 16,000 sq. m. to Greek territory. Further gains were made at the expense of Bulgaria, who in 1913 attacked her former allies, Greece and Serbia, owing to quarrels over the partition of the Turkish spoils.

The outbreak of the First Great War divided the Greek nation. Some hoped that Greece might be able to remain neutral. Others supported Venizelos and were for taking the side of Britain, France, and Russia. In the end the latter prevailed, and King Constantine lost his throne in 1917, the Powers which had guaranteed Greek independence demanding his expulsion from the country. He was succeeded by his second son Alexander, a young man of 24, who died in Oct., 1920.

#### Constantine's Second Abdication

Venizelos throughout the period 1917-20 was virtually dictator. Constantine was restored in Dec., 1920. The next year Greece attacked Turkey in Asia Minor. The defeat of her army in Aug., 1922, led to her loss of Smyrna and Eastern Thrace, acquired by her after the First Great War. Constantine, held responsible for this defeat by a section of the army, was forced to abdicate in Sept. He died some four months later. He was succeeded by his son George II who, however, was driven from the country at the end of 1923. In Jan., 1924, Venizelos was back as premier, but he resigned Feb. 4, through ill-health, and was succeeded by Kaphandaris. Admiral Condouriotis (*q.v.*) was regent, 1924.

A republic was proclaimed in March, 1924, Condouriotis being appointed president. In June, 1925, a revolution broke out in Athens, Salonica, and Patras, when Theodore Pangalos (1879-1952), a republican general, seized power and became prime minister. Early in Jan., 1926, he proclaimed a dictatorship, and in April took over the presidency of the republic; but another revolution, headed by General Condylis, a remarkable man of peasant origin, ended the dictator's power in Aug. In 1928 Venizelos returned to Greece from retirement in Paris, becoming prime minister again until 1932. The outstanding achievement of this administration was the agreement with Turkey, Oct., 1930, which inaugurated friendly relations between Greece and her former adversary. Venizelos, succeeded by the Populist Tsaldaris, lost his popularity when he backed an unsuccessful rebellion by Gen. Plastiras, 1933. He retired once more to Paris, where he died 1936.

The people of old (southern) Greece remained predominantly monarchist, and Gen. Metaxas, an anti-Venezelist and a man of great ability, placed himself at the head

of a vigorous movement for the restoration of the king. Tsaldaris resigned, and Condylis, his minister of war, then formed a government, which brought back the king, Nov., 1935. General elections held in Jan., 1936, resulted in the formation of a government by Demerdjis, who died a month later. Metaxas, deputy prime minister and minister of war, assumed the premiership, suspended the constitution, and made himself dictator, Aug., 1936.

**SECOND GREAT WAR.** When the Second Great War broke out Greece remained neutral until on Oct. 28, 1940, the Italians, following an ultimatum summarily rejected by Metaxas, invaded Greece from Albania half an hour before the ultimatum expired. Winston Churchill, the British premier, immediately sent a message promising all the help in Britain's power. The Greeks not only repelled the invaders, but in turn advanced into Albania, taking more than 20,000 Italians prisoner. Metaxas, whose leadership had counted for much in this successful stand, died in Jan., 1941. His successor committed suicide less than three months later, and Tsouderos, a former governor of the bank of Greece, took up the premiership on April 21.

#### British Military Aid

The probability that Germany would come to the help of her Mediterranean partner led to conversations between Gen. Wavell, British c.-in-c. Middle East, and Gen. Papagos, Greek c.-in-c., in Feb. at which the Greek commander, in view of the uncertainty of Yugoslav cooperation in case of attack, proposed to withdraw his troops from Macedonia, Thrace, and probably Albania (totalling 35 battalions), to the Aliakmon line, a short, naturally strong defensive line W. of Salonika.

**CAMPAIGN OF 1941.** The maximum British force that could be sent to Greece was part of the 2nd armoured div., the N.Z. div., the 6th and 7th Australian divs., and the Polish brigade. Their transport from Egypt would, it was estimated, take about 10 weeks. These were virtually all the troops in the Middle East fully equipped and fit for operations, and their dispatch meant leaving a very weak force in Cyrenaica where, however, the Italian armies had been so completely defeated that a counter attack from them could be ruled out at least for some time.

The Germans entered Bulgaria on March 1, and it was then found

that, apparently for political reasons, Papagos had not concentrated his troops as he had proposed, and that, therefore, there was every prospect of their being defeated in detail. The difficult nature of the country, the poor communications, and the severe climate in March and April added to the problems confronting the British forces under Gen. Sir H. Maitland Wilson whose dispatch to Greece began on March 5.

#### The German Invasion

The German invasion started on April 6. By that time the 1st armoured brigade group and the N.Z. div. had arrived complete in the forward area, and the 6th Australian div. was in process of arriving. The 12th and 20th Greek divs. were on the line which ran from the Aegean Sea E. of Mt. Olympus to Veria and Edessa, and thence N. to the Yugoslav frontier. This position had the weakness that, if the Yugoslavs were attacked and failed to hold the enemy, it could be outflanked from an easy valley that runs from Monastir to Kozani. A detachment placed in the last days of March at Amynteion to watch this gap was, after the collapse of Yugoslav resistance on April 8, reinforced.

The enemy attacked in the Amynteion area on the evening of April 10, and because the troops available were inadequate to hold the positions on which they stood, withdrawal was made to the Aliakmon line, running from Mt. Olympus along the Aliakmon river. During this withdrawal the Greek divs. disintegrated, not through lack of courage, but from lack of modern armament and the slowness and unwieldiness of their ox-drawn transport; and contact was lost with the Greek armies in Albania (Epirus) which could not now withdraw to take their agreed place in the Aliakmon line W. of Gen. Wilson's force. A further withdrawal therefore began, to the Thermopylae line, which could be held at least for a time by the Imperial forces alone.

The Germans followed rapidly, and on April 15 launched an attack on a combined N.Z. and Australian force in the Pencios Gorge. The pass was defended with spirit, and when on the 18th the Germans were masters of it, the main body of the Anzac corps had withdrawn successfully to Larissa. Mist and low cloud had so far prevented the enemy from using his air mastery effectively, but from Larissa onwards columns



Greece. The Swastika going up over the Acropolis after the German entry into Athens, April 27, 1941

on the road were attacked from the air without respite.

By the morning of April 20, the N.Z. div. occupied the Thermopylae line from the sea to the summit of the mountains, and the 6th Australian div. occupied the Brailos position covering the main road to Thebes and Athens. The 1st armoured brigade, which had lost most of its tanks through mechanical breakdown, was in reserve protecting the right and rear of the Anzac corps against a threat from Euboea. The disintegration of the Greek forces, however, made possible a German penetration on the extreme left of the line about Delphi.

#### Withdrawal of Forces

Clearly, little could be expected from the Greek forces in Albania, and that Greek resistance could not long continue. Piraeus, at which most of the British forces in Greece had landed, had become virtually unusable through bombing. Gen. Wavell cancelled the sailing of further British troops and arrived in Athens himself on April 19. The prime minister had committed suicide the day before, and the king, acting as head of his government, agreed that the evacuation of the British forces was essential.

On April 21 the Greek armies in the Epirus capitulated. The withdrawal from Thermopylae was covered by a brigade group of the N.Z. div., which inflicted severe losses in men and tanks on the enemy. Embarkation from open beaches began on the night of

April 24-25, and was completed on May 1. (Small groups of those left behind continued for months to reach Egypt in little boats.) The troops sent to Greece numbered approximately 57,660. Close on 43,000 were, thanks to the magnificent work of the R.N., re-embarked, but they had lost all guns, transport, and equipment other than personal equipment; 27,000 were landed in Crete (*q.v.*), the remainder taken to Egypt. German parachute troops cut the Corinth canal on April 26, and on the 27th the enemy entered Athens.

**GERMAN OCCUPATION.** When the Greek forces in Epirus capitulated, King George II with the crown prince and the government left Athens for Crete, whence, after a narrow escape from capture by German parachutists, he was taken off by a destroyer and landed in Egypt. In Sept. the Greek govt. was reconstituted in London where it stayed until March, 1943, when it moved to Cairo, remaining there until it returned to Greece in Oct., 1944. Throughout the German occupation of Greece, it represented Greek interests among the United Nations, and directed the raising of armed forces. Greek troops attached to the 8th army distinguished themselves in N. Africa at Alamein, and in Italy, particularly in the operations which culminated in the capture of Rimini Sept. 21, 1944.

In Greece itself the Germans immediately set up a quisling government whose attempts to

enlist support for the Nazi "new order" had no success; in town and country the people resisted their enemies. These included the Bulgars, who occupied W. Thrace and E. Macedonia, and did their best to Bulgarise them. Only 20,000 to 25,000 Greeks were drafted for work in Germany, and some of them were repatriated because of the defeatist propaganda they spread. Sabotage was widespread; in reprisal about 1,500 villages were burnt, rendering a million and a quarter homeless. Tobacco and currant harvests decreased to 11 p.c. and 34 p.c. respectively of pre-war production. A quarter of Greece's limited forests were destroyed, 90 p.c. of her large bridges and 50 p.c. of her smaller ones. Loss of life through guerrilla fighting, famine, executions, and deportation amounted to 480,000.

#### Guerrilla Activities

By the beginning of 1943, guerrilla activities had become widespread, but attempts to co-ordinate the various forces, whose total was estimated at 25,000 men, failed. They were divided into two politically hostile bodies, which fought one another as well as the enemy, even while their country was occupied. Their internecine strife continued after the Germans, threatened in the rear by the rapid Russian advance into the Balkans, withdrew in Sept.-Oct., 1944, and British and Greek regular forces from Italy, and then the exiled government from Cairo, arrived in Greece.



Greece. British statesmen took an active part in trying to settle the political crisis after the Greek liberation in 1944. Archbishop Damaskinos is here seen presiding over an historic conference, Dec. 26, 1944, with Winston Churchill and Anthony Eden on his right, and F.-M. Alexander on his left

AFTER LIBERATION. Distrust of the king, whose support of the Metaxas dictatorship had made him suspect among many Greeks who were not republicans, was a further complication. Under British pressure, the king deferred his return to Greece and nominated as regent a man respected by all, Archbishop Damaskinos, head of the Greek Church. A general election held in March, 1945, was boycotted by the Communist-directed E. A. M. (Ethnikon Apeleutherikon Metapon, national liberation front), and, to prevent intimidation of voters, was observed by an Allied civil mission of 240 teams. It gave a victory to the Populist (royalist) party of 191 out of 317 seats. A plebiscite on Sept. 1 gave 68.96 p.c. of votes for the king, who returned to Greece on Sept. 27. He died on April 1, 1947, and was succeeded by his brother Paul, who began his reign in a country still rent by civil war, still suffering distress as a result of the destruction of the years 1941-44 and the subsequent internal strife.

A United Nations commission, appointed in Oct., 1947, confirmed Greek allegations that the rebels were receiving support from

Greece's Russian satellite neighbours, Albania, Yugoslavia, and Bulgaria. But Yugoslavia's support soon came to an end after that country was expelled from the Cominform in 1948, and by the end of 1949 the Greek govt. was in control of the whole country, and able to start on reconstruction. Greece was among the countries helped by the European Recovery Programme.

*Bibliography.* Herodotus, Eng. trans. G. C. Macaulay, 1890, and G. Rawlinson, 1897; Plutarch's Lives, Eng. trans. T. North, new ed. 1898; History of Greece, C. W. C. Oman, 7th ed., 1901; A Smaller History of Greece, W. Smith, 1905; Greece, J. Fulleylove and J. A. McClymont, 1906; History of Greece, G. Grote, new ed. 1869-70; condensed and ed. with notes, etc., J. M. Mitchell and M. O. B. Caspari, 1907; Ancient Greece, G. G. A. Murray, 1911; History of Greece to the Death of Alexander the Great, J. B. Bury, 1913; Greece, A. J. Toynbee, 1915; Ottoman Empire and Its Successors, 1801-1927, W. Miller, 3rd ed., 1927; Early Age of Greece, Sir W. Ridgeway, 1931; Thucydides, Eng. trans., Sir R. Livingstone, 1943.

**Greek Archipelago.** Cluster of islands in the Aegean Sea (*q.v.*).

Towards the end of the 8th century B.C. oriental influences began to be felt, through contact with the Phoenicians, the Lydians, and the great empires beyond. Greek pottery became covered with luxuriant patterns of rosettes and plant motifs, still in horizontal bands, and with sphinxes, lions, and other creatures. These influences immeasurably enriched Greek art, and when after about a century they had been assimilated, a new essentially Greek art developed—the Archaic art of the 7th and 6th centuries B.C. Pictures in the true Greek manner appear on the pottery, at first isolated scenes of combat or exploits of heroes. The François vase, an Attic black-figure work of the 6th century B.C., shows the handicraft of this time at its best.

#### The Beginnings of Sculpture

The beginnings of Greek sculpture belong to the later part of the 7th century. As temples were built to the gods, these came to be adorned with figures intended to represent the deities or their worshippers. Two basic types are met—the naked male figure, called *Kouros*, standing stiffly upright, with the right foot forward, and the draped female figure, *Kore*. Some of the finest come from the Acropolis at Athens and belong to the period just before the Persian invasion. But the progress made by the Greek artist in representing the human form was very rapid. For some time he obeyed the law of frontality which prescribes that the figure shall be symmetrical about a straight vertical line, and when this limitation was overcome, he continued to represent the most typical aspect of his subject, or even to combine typical aspects of its several parts, for instance showing a full-faced body with the legs of a runner in profile.

The limits of strictly religious art were passed when athletes who won victories in the games were permitted to dedicate their statues. Hence came a powerful impulse to the study of the human form, and in due time to the reproduction of individual features, though true portrait sculpture begins at the earliest in the 5th century. Ancient writers tell of a mythical Daedalus as the founder of a school of sculptors; the names of many of his successors are historical, such as Archermus of Chios, Dipoenus and Scyllis of Crete, and Rhoecus and Theodorus, the inventors of casting in bronze.

## GREEK ART AND ARCHITECTURE

H. Stuart-Jones and F. J. Maclean

*Information complementary to that contained in the two following articles will be found under the headings Athens; Acropolis; Apollo; Architecture; Art; Sculpture; Theatre; the biographies of the great sculptors, Apelles, Pheidias, etc.; and the names of famous buildings, e.g. Erechtheum, Parthenon. See also Aegean Civilization; Crete; Mycenaean; Troy, and plates facing pp. 3920-21*

Greek art is of capital importance in the story of civilization. Its maturity marks the liberation of the artist from the religious conventions which, in oriental societies, denied his genius free play; and the Greek artist could therefore depict nature as he found it. He did not, however, spring unheralded into being. His development was gradual, and he owed much to his predecessors. Nor was his the first great art that had enriched the Aegean lands.

#### The Mycenaean Age

The earliest art in Greece is that of the Mycenaean Age which was developed under strong Cretan influence. It shows certain elements, however, particularly in architecture, that are northern and foreign to the purely Mediterranean culture of Crete. The most notable of these is the *megaron* type of house, i.e. the house in which the essential feature is an oblong great hall.

The Mycenaean art also acquired some skill in sculpture, of which the chief examples are the beasts on the Lion Gate at Mycenae. In the smaller arts, masterpieces of decoration were produced, including remarkably naturalistic work such as the gold cups unearthed at Vaphio; but Mycenaean art lacks the sobriety and symmetry of true Greek art. It died out in the invasions of the heroic age, but the young Hellenic civilization which followed inherited from it a tradition of finely made pottery and other basic techniques.

The earliest purely Greek art is represented today almost entirely by pottery. A well-marked style, called the Geometric, developed soon after 1000 B.C. The vases, which are well made and well shaped, are decorated with numerous horizontal painted bands between which are lozenges, squares, and other geometric figures.



As in early handicraft, so in sculpture, we find an Ionic school working largely in the Aegean islands and known to us from works dedicated at Delos, but also active at Athens; and on the other hand a Dorian school which worked in the Peloponnese—where Sparta was then still an art-centre—and in the western colonies.

Sculpture had early become linked with religious architecture, the continuous frieze above the column of the Greek temple and the "metopes," or square slabs filling what had been empty spaces between the beam-ends of wooden buildings, gave golden opportunities for work in high or low relief; the triangular pediment presented a fresh problem, which the Greek was not slow to solve. In an early attempt made in Athens, Heracles is shown wrestling with Triton.

The material was a soft, calcareous tufa, which was covered by a thick layer of paint—red, blue and green. This work belongs to the 6th century, during which the Peisistratid tyrants made Athens a great art-centre, attracting from both Ionia and the Peloponnese, especially the former, the best talent of the time.

#### Athenian Vase Painting

Other foci of artistic development were the sanctuaries of Delphi and Olympia, which rulers, states and individuals from E. and W. filled with their offerings; and the advance towards technical mastery had made great strides even before the Persian wars (490–479 B.C.), which raised the national consciousness of the Greek to the most intense pitch, and was followed by the attainment, within a few decades, of the highest artistic perfection. In particular, the Athenian vase-painters showed a marvellous fertility of imagination, combined with great delicacy in line-drawing and skill in adapting their compositions to a curved surface. Euphronius, Duris and Hieron are the most famous, but many of the finest vases are unsigned.

The severity of the earlier works of this time, such as the bronze charioteer dedicated at Delphi by a Syracusan prince or the pediment of the temple of Aphaia at Aegina soon gives way to the marvellous freedom of the discus-thrower of Myron. The so-called canon of Polyclitus represented the frame of the human athlete in its perfect type; and the sculptures of the Parthenon, though we cannot trace in them the hand of Pheidias himself, to whom was entrusted the general supervision of the decoration of the temple and the carving in gold and

ivory of the statue of Athena, of which a reduced copy was found at Athens, reveal both by design and execution a group of craftsmen of unsurpassed cunning.

Naturally much less is known of the painting of the same period in which Polygnotus was the most famous name; but we can perhaps form some idea of the style of his great frescoes of the fall of Troy and the under world, both at Delphi, from Athenian vase paintings. At Olympia, the great temple of Zeus, with its pediments, belongs to the earlier half of the 5th century; the statue of the god was the work of Pheidias, but we have no material for an adequate reconstruction of it.

#### Developments of the 4th Century

The great war which devastated Greece in the closing decades of the 5th century B.C., to some extent severed the intimate association of art with national life; it also affected the distribution of the national wealth, and led to a lowering of religious conceptions and of political standards. Thus in the 4th century we find in the finest works not so much an embodiment of ideals as a refinement of the artist's individual conception of beauty; moreover, the execution of the earlier period, masterly as it was, was surpassed by that of the great sculptors of the new time.

We possess an original by Praxiteles in the Hermes at Olympia in which the treatment of flesh and drapery, alike at once in its realism and its grace, is inimitable. We can only rely on copies for his more famous works—the Satyr and the Aphrodite of Cnidus; his contemporary Scopas, who excelled in the rendering of passion, must be judged by the heads from the pediment designed by him for a temple at Tegea in Arcadia.

The athletic school of Sicyon produced its master in Lysippus, of whose Apoxyomenos (an athlete scraping himself with a strigil) there is a copy in the Vatican which is more slender in its scheme of proportions than the Canon of Polyclitus. Lysippus was also a master of portrait sculpture, which now at length, in the hands of Silanion and others, attained individual realism (a fine example is the portrait of Demosthenes, by Polyectus). He was commissioned to reproduce the features of Alexander the Great, which we recognize in many works, including the head of a marble statue found at Cyrene after the Italian occupation of Cyrenaica in 1912. Alexander also employed the greatest of Greek painters, Apelles, who, with his rival Proto-

genes, succeeded to the places occupied at the beginning of the 4th century by Zeuxis and Parrhasius. These are, however, no more than names to us. The use of colour in connexion with sculpture is illustrated by the magnificent series of sarcophagi discovered at Sidon, one of which represents Alexander in battle and the chase.

In the Hellenistic age which followed the death of Alexander, art was affected by the changed social and political conditions. The monarchies which arose from the ruins of Alexander's empire, and such communities, e.g. Rhodes, as enjoyed a measure of freedom under their protection, enlisted the services of the greater artists for the erection and adornment of their public monuments. The famous Colossus of Rhodes, which fulfilled the function of a lighthouse, was the work of Chares, a pupil of Lysippus. The Victory of Samothrace, a colossal statue of the goddess standing on the prow of a ship, which is now in the Louvre, commemorated a naval victory won by Demetrius Poliorcetes in 306 B.C. The Fortune of Antioch, an early example of the personifications popular in this period, is represented by a statuette in the Vatican; it was the work of Euty-chides of Sicyon, another pupil of Lysippus.

#### Art in Pergamum

The kings of Pergamum were the chief patrons of art in the Hellenistic age. Their victories over the Gaulish invaders of the 3rd century B.C. were commemorated both by a series of life-sized statues and groups, some of which survive in originals and copies, the most famous being the Dying Gaul of the Capitoline Museum, Rome, and also by a number of smaller groups representing the combats of gods and giants, Athenians and Amazons, Athenians and Persians, and Pergamenes and Gauls, regarded as typical of the struggle between Greek and barbarian. The Apollo of the Belvedere, now in the Vatican, an antique copy of a bronze Greek original, assigned by some to the 4th century, perhaps rather commemorates the repulse of the Gauls from Delphi in 279 B.C.

Above all, the great altar erected on the Acropolis of Pergamum, probably by Eumenes II (197–159 B.C.) is decorated with a frieze in high relief depicting the battle of the gods and giants, in which a new art, distinguished by dramatic force and technical bravura, is brilliantly represented. A school of artists which flourished at Rhodes in the century preceding the Christian era has left us the



Greek female costume. Left to right : peplos or outer garment ; girl fastening the chiton over her shoulder with brooch or button ; basket-carrier at a festival, showing girdle and sandals ; girl in chiton and slippers donning the peplos



Priestesses pouring libations, showing various types of drapery and head-dress : a kalyptra or veil, kekryphalos or cap confining the hair, and stephanê or crown. Right : lady in old-time costume seated



Greek youth in chlamys or short mantle, and wearing a pilos or close-fitting felt cap. Centre : a warrior in field dress. Right : a peasant wearing petasos or soft cap, and high boots

## GREEK COSTUME AS RECORDED IN MURAL PAINTING AND SCULPTURE

*From Costume of the Ancients, by Thomas Hope*

group of Laocoon and his sons, with its exaggerated pathos. From Tralles in Asia Minor came Apollonius and Tauriscus, the sculptors of the Farnese bull at Naples, a group which represents the punishment of Dirce by Amphiion and Zethus. The scientific research of the time left its trace in the Borghese fighter of Agasias, an Ephesian sculptor, which is interesting as an example of minute anatomical study.

#### Decorative Arts

Artists also catered for the tastes of the wealthy class which sprang up in the capitals and other great cities of the new monarchies. Painting and mosaic were employed in the decoration of private houses, especially at Alexandria, and the discoveries of Rome and Pompeii enable us to form some idea of the results. Alexandria was the chief, but not the only, home of Toreutic, or the art of the chaser of gold and silver, of whose work Roman plate gives us the best impression. The terra-cotta statuettes and groups found in tombs, especially those of Tanagra in Boeotia, are works of great charm and delicacy.

The growth of private luxury was also responsible for the popularity of genre subjects in sculpture, of which the best example is the Boy and Goose by Boethus, for the loss of religious significance in the representations of divinities, as in the instance of the Medici Venus and the Aphrodite in the Bath of Doedalsas, and the hybrid of painting and sculpture seen in the pictorial reliefs used in wall-decoration. Lastly, after the Roman conquest, we find a recurrence to early models in the Neo-Attic school of archaising artists.

H. Stuart-Jones

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**ARCHITECTURE.** Before the 7th century B.C. the architecture of the peoples inhabiting the Greek peninsula and parts of the Asia Minor coast was too deeply impregnated with Persian, Egyptian, and Assyrian elements to be regarded as a distinctive style. The discoveries at Tiryns (Troy), Cnossus, Mycenae, and other places have revealed the existence of an elaborate architecture four or five centuries earlier than the beginnings of the real Greek civilization; but those buildings had little or nothing in common with the form or spirit of what is now understood by Greek architecture. It is only after the lapse of 400 years that the national archi-

ture begins to emerge. Even then, its massiveness and bold proportions are suggestive of Egypt rather than Greece, and it is not until the 5th century B.C. that this massiveness is refined into the combined stability and grace of Doric building.

The main principle governing Greek building was ordered symmetry combined with picturesqueness of effect. Individually, the Greek temple, fully developed, is an oblong structure enclosed by a row of columns. In its earliest form it was a small square apartment in which the image of a particular deity was placed, with a porch formed of two flanking piers, and two columns between them, on its front. The next step was to separate the apartment, or cella, from its porch by a screen with a doorway. The porch was then further developed by the addition of an outside screen of four columns, which number was subsequently increased to six, so as to enable the two at the extremities to outflank the actual front and form a starting-point for a range of columns carried round the remainder of the building. Thus was evolved the hexastyle temple, which is the typical form of the mature Greek temple enclosed in its envelope of columns. The Parthenon itself is exceptional in that it had a hexastyle portico at each end of the cella, and, outside, a further portico which was octastyle (eight-columned); but the hexastyle type is the prevailing one.

#### Grouping of Buildings

The building consisted of a single storey with a low-pitched roof ending in a pediment. Height was not aimed at, nor is there any great variety of outline. On the other hand, these buildings were grouped so as to secure the maximum effect of picturesqueness. No two of those which once crowned the Acropolis were placed in line with each other. They were set at various angles, conforming to the rise and fall of the ground, from which they appeared, spontaneously and naturally, to grow.

Moreover, the Greek temple, regularly outlined, exquisitely though not mathematically proportioned as it was, did not rely wholly on its form. The architectural ornament of its exterior was decked out in bright primary colours, sometimes gilded; marble was often covered with coloured stucco, and sculpture was painted, until the whole must have sparkled with points of colour in the sun.

Greek architecture was dominated at successive periods by three Orders, of which the first

and best beloved was the Doric. In Athens, one of the best preserved buildings of this Order is the so-called Temple of Theseus. Excavations carried out at Olympia in 1876 laid bare the foundations and plan of a great Doric temple of Zeus, and of others, while many similar structures have been unearthed in Crete and the islands of the Archipelago, the western coast of Asia Minor, and in Sicily and the toe of Italy, where Greek colonies existed.

The evolution of the Ionic Order is less easy to trace than the Doric. The volute capitals, which are its distinguishing feature, appear to have originated in Asia, and there are no known examples in Greece itself earlier than the 5th century. The Erechtheum, on the Acropolis, the greatest of all Ionic temples, was built about 420 B.C. In Asia Minor, however, Ionic temples existed before the Persian Wars.

Just as the use of the Doric Order reached its climax of splendour a few years after the building of the Parthenon (447 B.C.), so the maturity of the Ionic followed the Erechtheum within the space of a few years, as if, in each case, the production of a great example was needed to give the impetus to the development of the style. Doric had satisfied the early aspirations of the Greek builders to comeliness of form and fine proportions, but denied them the greater freedom of purely architectural ornament which they desired.

The Ionic Order gave them a new opportunity. The Ionic volute, in its original form, had a two-sided capital. This was found unsatisfactory at the corners of buildings where the capitals had to show their ends, while those next to them showed their broadsides and volutes. A new corner capital was accordingly invented which, by a slight modification of the volutes, was transformed into a four-sided capital, thus enabling the continuity in the whole line of capitals on a front to be preserved. This order also admitted more than one treatment of the bases of columns, and variety in the treatment of the entablature.

#### The Corinthian Order

The Corinthian Order, the latest of the three employed by the Greeks, was not introduced much earlier than the age of Alexander the Great. Its foliated capital appears to have been borrowed from the bell-shaped capital of the ancient Egyptians, though the acanthus leaf ornament with which the Greeks covered it was practically their own device. A little circular

building at Athens, known as the Choragic Monument of Lysicrates, is accredited as the best example of this order on Grecian soil; it was erected about 334 B.C. But the style was never fully developed in Greece, and its manifestations are chiefly found in the architecture of the decadence; it is rather a feature of Roman architecture than of Greek.

Of Greek municipal buildings very few traces remain, but in the time of Pericles (5th century) the Agora, or market place, of Athens had its porticoes and colonnades enriched with painting and sculpture in a manner befitting the great industrial centre of the city. Domestic architecture retained the Oriental type, squat and bare on the outside, with roofs sloping to the courtyard, presenting no features of architectural interest. The Greeks were not tomb-builders.

The theatres were built on a scale surpassing that of all other public buildings, both in Greece itself and in Asia Minor; the theatre at Dionysus was no less than 443 ft. in diameter; but the proscenium of these great masses of masonry were the only points treated architecturally, and none of them has survived.

F. J. Maclean

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**Greek Church.** Name given to the Eastern or Oriental Church, the full title of which is The Holy Orthodox Catholic Oriental Church. The name Greek is given to this Church because it was Greek in origin, and most of its ecclesiastical liturgies and literature were composed in that language. The Greek Church is today the third largest section of Christendom, having some 130,000,000 members as against 230,000,000 Roman Catholics and 140,000,000 Protestants. By far the greatest number of its members belong to Russia, the remainder being scattered about Turkey, Greece, Yugoslavia, Rumania, Bulgaria, Egypt, Palestine, and Cyprus.

In primitive times the Eastern and Western parts of Christendom formed a single church, and it was only gradually that the separation took place. Many causes contributed to this result. When Constantine transferred the capi-

tal of the empire from Rome to Constantinople, it was inevitable that the Roman empire would split into two divisions, and that the political rivalry between these two divisions would be reflected in the Church.

It soon also became clear that the genius of the East differed from that of the West. The East was more interested in the speculative problems of theology, the West in form and organization. The spirit of the East finds its best expression in the writings of Origen and the Alexandrian fathers; the spirit of the West in those of Augustine. To the East we owe the metaphysical side of Christian theology, especially in Christology; to the West the doctrines of sin, grace, and predestination. For some centuries the two Churches gradually drifted apart, but it was not until the 9th century that the final rupture took place. The actual occasion for the division was a controversy upon the Filioque clause in the Nicene creed.

#### Points of Difference

In addition to the theological difference, there were several outstanding points upon which the two Churches diverged: (1) the Eastern Church maintained the absolute equality of the different patriarchates and refused to acknowledge the supremacy of the pope of Rome; (2) the Eastern Church refused to adopt the rule of celibacy for the mass of its clergy, and allowed all except the bishops and monks to marry; (3) the Eastern Church always maintained communion "in both kinds," and refused to consent to the Roman practice of withholding the cup from the laity; (4) it also insisted on "trine immersion" in baptism; (5) it allowed the use of the vernacular in its liturgies and public worship; (6) the Eastern Church does not accept the Apostles' or the Athanasian creed, both of which are of Western origin; but regards the Nicene creed without the Filioque clause as the basis of its faith.

As a result of its belief in the equality of the patriarchates the different national sections of the Eastern Church maintain a considerable amount of independence. The orthodox Church of Russia was formerly subject to the patriarch of Constantinople, but as it grew in importance and numbers a separate patriarchate was established at Moscow in 1582, and in 1721 a holy synod was

established at St. Petersburg whose jurisdiction extended across two continents. The national Church of Greece also secured its independence in 1852, and has a synod and archbishop of its own. Serbia (Yugoslavia), Rumania, Poland, Bulgaria, and Albania have their own synods.

Various attempts have been made at different times to bring about a reunion between the Eastern Church and the Churches of the West. At the councils of Lyons, 1274, and of Ferrara, 1439, fruitless efforts were initiated to heal the breach. The papacy has always presented an insurmountable barrier. Overtures have also been made by the Lutheran Church, but the difficulties have always proved intractable.

Specially friendly relations exist between the Orthodox and Anglican Churches. At the invitation of the archbishop of Canterbury, the oecumenical patriarch sent delegations to conferences at Lambeth to discuss doctrinal questions. A joint commission of Orthodox and Anglican divines set up at Lambeth, 1931, reached agreement on some points, and, though it failed to achieve unity, proposed that the quest should be continued.

Germanos, Metropolitan of Thyateira, Exarch. of W. and Central Europe

**Greek Fire.** Inflammable composition used by the Byzantine Greeks for defensive warfare. According to many accounts it was inextinguishable and was able to burn under water. Its invention is ascribed to Callinicus of Heliopolis in A.D. 668. The composition of Greek fire is a matter of uncertainty. Aeneas Tacticus gives it as a mixture of sulphur, pitch, charcoal, incense, and tow, while Vegetius adds naphtha.

It was used against the enemy in various forms, the simplest being a tube packed full of the composition and thrown like the modern grenade. It was often blown through copper tubes, fixed in the prow of the vessel. There is very little doubt that gunpowder, or some composition very like it, was also used to hurl missiles of Greek fire composition which exploded on impact.

The secret of Greek fire was well kept, and the terror it inspired, apart from its devastating effects, prevented the capture of Constantinople for many centuries. The use of various forms of Greek fire was continued till the 14th century when gunpowder took its place. See Explosives; Flame Weapon.

# GREEK LANGUAGE AND LITERATURE

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*This article is supplemented by articles on the Greek writers, e.g. Hesiod and Homer; the dramatists, e.g. Aristophanes, Euripides, and Sophocles; Thucydides, and other historians. See Acting; Drama; Theatre; also Alphabet*

Greek is a member of the Indo-European family of languages. The view that there existed a special affinity between Greek and the Italic languages, due to an original Greco-Italian language, is no longer held. The common primitive language of the Greek stocks is unknown; the Homeric poems, the earliest existing record, exhibit forms belonging to various times and different idioms. According to the ancient Greeks themselves, Greek once contained three (four) distinct dialects—Doric, Aeolic, (Attic) Ionic, named after Dorus, Aeolus, and Ion, the three legendary ancestors of the Hellenic race.

Modern philologists are content with two main divisions: Ionic and non-Ionic, the former including the language of Homer, the new-Ionic of Herodotus, and Attic (Athens), the latter Doric (Sparta, Corinth), Aeolic (Boeotia), and Achaean (northern Greece). At the end of the 6th century B.C. a dialect of the Ionic group, that of Athens, whose political, social, and industrial superiority had raised her to the position of the metropolis of Hellas, asserted and maintained its supremacy over the rest.

The history of the Greek language may be roughly divided into the following periods: Attic (500–300 B.C.); Hellenistic (300 B.C.–A.D. 600); Byzantine (600–1453); modern (1453 to the present day). After the subjection of Greece to the rule of Macedonia, Attic became the popular language at the Macedonian court. The conquests of Alexander in Egypt and the East, the substitution of Alexandria for Athens as the centre of learning and civilization, and the foundation of new Hellenic communities, led to its adoption as the general means of communication.

The result was the formation of a dialect called Hellenistic or Koine, universal or common Greek, as distinguished from the pure Attic. The term Hellenistic was formerly limited to the language of Greek-speaking foreigners, especially Jews, and was used with special reference to biblical Greek, but is now generally understood to mean the language spoken from the time of Alexander the Great to the establishment of the Byzantine or Eastern empire. Many specimens, in colloquial style but of no particular literary interest, have been found in Egypt. The incorporation

of Greece in the Roman Empire did not lead to the absorption of Greek by Latin; in fact, as Horace says, "the conquered took captive the conqueror." Many Latin words, however, especially official, were introduced. The military character of Roman rule checked literary initiative, and left scope for the development of the colloquial idiom.

Capitals	Minuscules	Greek Names	English	Modern Greek
A	α	Alpha	a	a
B	β	Beta	b	v
Γ	γ	Gamma	g	gh, y
Δ	δ	Delta	d	th (in that)
E	ε	Epsilon	e	e (in let)
Z	ζ	Zeta	z	z
Η	η	Eta	ee	ee
Θ	θ	Theta	th	th (in thin) (in thin)
I	ι	Iota	i	i
K	κ	Kappa	k	k
Λ	λ	Lambda	l	l
M	μ	Mu	m	m
N	ν	Nu	n	n
Ξ	ξ	Xi	x	x
O	ο	Omicron	o	o (in not)
Π	π	Pi	p	p
Ρ	ρ	Rho	r	r
Σ	σ, ς	Sigma	s	s
T	τ	Tau	t	t
Υ	υ	Upsilon	u	i
Φ	φ	Phi	ph	ph
Χ	χ	Chi	ch	ch
Ψ	ψ	Psi	ps	ps
Ω	ω	Omega	o	o (in note) (in note)

The signs ' ' represent the hard (as in *hat*) and smooth breathings, the latter merely denoting a catch in the breath. Neither has any value in modern Greek. Three older letters, Ϝ, ϝ the digamma, having the sound of v or w; Ϟ, the hard k; and Ϡ representing s, were dropped as being of no further use, although they were retained as numerals.

**Greek Alphabet as finally adopted in 403 B.C.**

The conversion of Rome to Christianity and the removal of the capital to Byzantium (Constantinople) had far-reaching effects. The classical spirit gave way to new ideas; during this period the name Greeks, as savouring of paganism, was replaced by Romaei (Romans). But the language itself was saved by the church; the fathers studied it and wrote in it, and in fact all written compositions were modelled on classical Attic. The efforts of the

Comneni (1050–1200) to revive the classical language have their parallel in those of the purists of modern Greece. The subjection of the country by the Turks had but little effect. It was chiefly seen in words relating to food and dress, and terms of abuse.

Similarly, French (chiefly referable to the Frankish empire at Constantinople, 1204) and Italian (owing to commerce with Venice) contributed to the vocabulary. But with all this the modern language cannot be called a mixed language; it is the natural analytical development of Hellenistic, a direct survival of classical Attic, though impoverished, corrupted, and modernised.

Ancient Greek was one of the most highly inflected languages of the Indo-European group. Its euphonic vowel system, the softness of its consonantal combinations, the richness of the inflexional forms, especially in the verb, its adaptability to the formation of compounds, rendered it highly suitable for rendering abstruse and scientific terms. A glance at any technical work, or indeed at the columns of a newspaper, will show how much English is indebted in this connexion to the language of ancient Greece; e.g. aeroplane, gramophone, cinematograph, telegram, telephone.

**LITERATURE.** The temporal range of Greek literature is enormously long. No fewer than 2,300 years divide Homer from the Turkish capture of Constantinople; and yet Homer is evidently the mature product of a high culture which had generations of primitive poetry behind it; and the Byzantine prolongation of the literature was still alive in 1453. Though not for all this time giving form to the highest and largest achievements of the human mind, Greece never, even in her decline, fell below the capacity to furnish at least an articulate chronicle of events.

Such useful longevity is only possible in languages which overflow racial and national limits, lending themselves to relays of peoples for their vehicle of thought and, thereby, part of their civilization; it is purchased at the sacrifice of idiomatic refinement. So the aesthetic beauty of the literature certainly declines as from the time when Alexander's conquests hybridised Greece. Indeed, it has been said that, whereas Greek prior to that date is unique, thereafter it became merely a literature like another. But it retained its workaday faculty of expressiveness, and was able to expand enough, after

many foreign intakes, to accommodate the quite new mind of Christianity.

A literary language is formed by one of a number of dialects establishing itself as supreme over competitors. The most expressive wins, but the power of expression is only then put to the proof when men of genius arise to make the inspiring demand upon its possibilities. As Latin among the ancient, as Tuscan among the medieval Italian dialects, so Ionic took the lead among the Greek, because Homer was an Ionian. But the great formative authors—a Dante or a Homer—borrow freely from other dialects; and the language, which eventually establishes itself as central, as the mother tongue, prevails by absorption as well as by exclusion. Both these ways of selection belong to its vigour. The language of Homer's *Iliad* and *Odyssey*, as well as that of Hesiod's *Works and Days*, has a strain of Aeolic in it.

#### Ionic and Attic

Ionic, once hallmarked by Homer, was further assured of primacy by Archilochus (7th century B.C.), a writer whom ancient criticism regularly esteemed as next only to him in greatness. And through the intermediate stage of Old Attic, Ionic emerges into the eventual Attic which is in perfection during the period between Pericles and Alexander. Thanks to the genius of Pindar, Doric maintains itself in Lyric during the 5th century; but after that time the mediums for composition are Attic, for prose; and for poetry, an artificial decorative diction.

Attic is the most Greek of Greek, and much that is commonly called Greek is distinctively Attic. The greatest legacy which Attic literature bequeathed to the world was not the masterpieces of beauty, crowded thick into two intense centuries (from Aeschylus to Menander is only three lifetimes), but language perfected as a reasoning instrument. The essence of Attic is that art and science (which in a romantic view are enemies) here are sisters: beauty and truth, two names for one ideal; writing, just the best of talk immortalised, having shed the triviality, but kept the ease. Attic may be said to culminate in Plato.

But the qualities to which Attic alone gave an intellectual determination are not absent from the literature of the other dialects. Sappho, whose reputation would probably suffer if her complete works were recovered, Alcaeus and Alcman all have the sharpness of touch which goes with high sensibility. The beauty of good Greek

is naked beauty, a grace of speech like the grace of proportion in a human body. These talents are there, but only devoted to the concerns of passion and of fancy; Athens applied them to discovery and reasoning.

The Greeks were unrivalled in inventiveness; they left no literary form undiscovered, if we except such an essentially informal composition as the Latin *Satura*, which had no unity about it but the author's personality. Yet even here the Roman claim of originality is doubtful. Forms have developed and shifted; what existed only in miniature for them has been executed on a great scale by moderns (e.g. the psychological narrative or novel of character). But it is almost literally true to say that one cannot point to any kind of modern book from which it would not be possible to ascend by a legitimate strain of pedigree to a Greek ancestry. Thus the literature of the ancient Greeks is the perfect field in which to study the curious laws (sketched by Brunetière and Ouvre) of the development of forms in literature.

We find certain forms corresponding to certain political epochs. Wares must have a market. The proper audience must exist. Homeric epic presupposes an aristocracy in whom the tradition of heroic chivalry and patriarchal polity still survives, at an interval sufficient to suffuse historical outlines with legend. Drama requires much intensity of city life for its atmosphere; it results from an increasing pressure from prose, i.e. poetry modifies itself into this form in order to keep a hold on the strictly intellectual purposes which prose expressly exists for—to prove and to persuade. For tragedy is poetical casuistry.

#### Athenian Comedy

The development of oratory belongs, of course, to democracy, a condition when men need to go armed in tongue and wit for their safety. The New Comedy of Manners is the entertainment of a cultivated bourgeoisie, living securely and serenely in a homogeneous society: the product of an Athens which has retired from being a great state. Greek genius never invented a more catholic form; it could be acclimatised anywhere.

Just when the literature of independence had evolved its complete round of manifestations, Macedonian imperialism provided the royal courts of Seleucia, Pergamum, and (pre-eminently) Alexandria, to foster all that range of productions for which democracy

has no use: the Callimachean and Theocritean schools of verse, the methodic curiosities of science, and the patient pieties of disinterested inquiry, to which mankind owes most of its knowledge of the past.

At every stage in a history which is motley with local diversities (Hellas, though small in area, having many centres or compartments) and violently accented with revolution (for they were a morally unstable people), the Greek genius rose to the challenge of creating the literary monument proper to that occasion. As their political philosophy traced a necessary cycle of politics from monarchy through aristocracy—plutocracy—democracy, to autocracy, so did they actually exemplify the normal successions of literature.

#### The Transformation of Homer

The forms continue duly to ramify and recombine themselves till every spark of vitality was worked out, e.g. when epic becomes impossible (because with increasing refinement of detail, no man's imagination can execute the line of beauty on the colossal scale), every element of epic yet persists, but transformed. The emotion of a Homeric battlepiece now vents itself in a chorus or a rhesus of tragedy, i.e. the stock is continued by a cross with lyric in that case, and rhetoric in this. Similarly, the Homeric *Aristeia* takes new life as the Epinician ode. Selected out of the general fabric of tradition, those stories in which the law of destiny and retribution is written in letters of blood and fire, are now enhanced to their full significance; and what has been a few lines of detail in Homer becomes for Aeschylus the *Orestean* trilogy.

Here was a certain peculiar quality of events when a superhuman power or scheme or law cuts into the quick of human affairs, to stultify pride; it was latent in the poetical mass. Greek genius elicits it, gives it full relief, appropriates the Dionysiac mummings as pulpit or stage to manifest it, and names it once for all *tragic*. The same principle may be traced in other successions; of the hymn, older than Homer, and now too exhausted to tempt ambition any more, there yet survives something able by alliance with epinician and rhetoric, to give birth first to the patriotic rhetoric of Herodotus' *Chronicles*, and later to Isocrates' *Panegyric*.

Tragedy itself has worked out its possibilities with Euripides, but it died only to come to life again in New comedy. Even the peculiar, inimitable Attic product, the Old comedy, left descendants in satire



and lampoon. With the Greeks no mood was ever at a loss for means of expression. The typical experience of Greece has at least taught us a few principles; such as, that great lyric and great oratory do not belong to the same age (since they are alternative modes); and that in times of great scientific discovery poetry will be mainly decorative.

#### The Growth of Prose

What marks the definite triumph of the Ionian in the competition for intellectual headship and spokesmanship of Greece, is the institution of prose. Poetry had attained to a very high range of facility, and had successfully discharged the functions of pleading and arguing besides its peculiar birthright of expressing mood, impulse, and the pride of life, while as yet nobody ventured the idea that language could be artistically beautiful and yet released from metre; release from a discipline or a constraint is how the Greek conceived this momentous revolution, the development of prose.

The discoverers of the Iambic had given to versified thought the lightest, easiest, most unaffected uniform that it could wear until the stern convention of artistic dignity was broken. But there came a moment when thought rebelled. It was as though some Chinese decree which ordained dancing as the only ceremonial mode of progression, were abrogated in favour of walking. The motive was the scientific curiosity which characterises the Ionian mind: it was Ionian philosophers and historians who made a new intellectual instrument out of unmetrical language, a medium hitherto reserved at best for annals, registers, etc., which might form the materials of history, and for the informal sayings and conversations of sages who professed no systematic theory.

Prose does not appear until the 6th century B.C., a round hundred years after Archilochus; and it does not impose itself at once as necessary in philosophy. Xenophanes (born c. 580), and long after him, Parmenides (c. 520) and Empedocles (c. 484), wrote in verse. But all the historians, from Cadmus and Pherecydes onward, used the new medium.

During the greatest period (the 5th century B.C.), as is usual at high points of civilization, we find Greek poetry and prose closely approximating. The reconciling force was rhetoric, i.e. the study of style. The systematic analysis of language was begun in Sicily by Corax and Teisias; but the first great masters

of self-conscious prose are Gorgias, Thrasymachus, Antiphon, and the other Sophists. They developed the effectiveness of language for argument and appeal by principles which are of fundamental validity. Earliest professors of dialectic and literature, under their influence the dividing line between prose and verse was narrowed down to actual metre; prose even assumed the emotional rhythm; and verse (dramatic) was refined away from the pomp of Aeschylus to the discreet pliancy of Sophocles; and this approximation continued as long and in so far as poetry continued to be a form of action at all, i.e. concerned with proving or persuading. A great prose writer like Thucydides has a poetical imagination; a great poet like Euripides has a scientific intellect.

But a century later and the two diverge again: poetry, now made wholly to please, "dresses up" without regard to common usage. Prose, devoted to science, in the hands of Aristotle's school, becomes almost as exact and disimpassioned an instrument as algebra. Indeed, there is no modern science which might not conveniently use Greek as a language, adequate to all its requirements in facility and accuracy. From the 4th century B.C. onward prose prevails: no books that deeply changed anybody's mind were written in verse henceforth.

#### The Koiné Dialektos

But after the loss of Athenian independence there is both a general decline in creative power and also a disestablishment of Attic from its position of dominance. The new capitals form new local centres, of which Alexandria is the chief. To correct this artistic decentralization, natural necessity evoked a new common language, the *Koiné Dialektos*, a federative language, as though English, American, and Pidgin-English were to coalesce nowadays.

It was cheap Greek, preserving somewhat of the readiness and frugality of Attic as an instrument, but more or less discoloured by contact with non-Hellenic on the fringes of the Mediterranean world; Greek written by and for Jews, Egyptians, Syrians, Italians, etc. Undistinguished rather than degraded, it offered the prose-artist no adequate means of refined craftsmanship. It was a medium out of which hardly anything but religious inspiration could make style.

Consequently, though serious writers, such as Polybius, Plutarch, Marcus Aurelius, used this ordinary Greek as it came to their

hand, Latinisms, barbarisms, neologisms, and all, without nicety, and never found themselves cramped for expression, more conscious stylists began as early as the 1st century A.D. to write a literary Greek, studiously learned from classical models, for their ornamental purposes. There were several waves of such Atticism, conscious renaissances of an obsolete fashion worked by academic aristocracies; the most famous is that to which Dion of Prusa (c. A.D. 40-117), Lucian (c. A.D. 125-185), a Syrian, and the Philostrati (c. A.D. 150-250) belong. The Atticist renaissances, and likewise all the poetry produced after the downfall of Athenian liberty, addressed themselves to learned coteries, not to the general average of an intelligent bourgeoisie as before.

Literature, it has been said, became now a chamber concert for virtuosi. Thus there is a regular barrier between, on the one hand, the poetry of Callimachus, Euphorion, the Anthology Little Masters, or the prose of Lucian and Alciphron; and on the other, the New Testament (on its literary side) and the popular propagandism of such sects as Cynicism.

In the Greek Romances we have a singular phenomenon: an essentially un-Attic, only half Hellenic thing, neglected all through the classical period, and finally taken up into polite literature in the period of Atticist renaissance. These stories, coming so late as they did, and so evidently creatures begotten in senility, have yet exercised a far greater influence on later literatures than any other product of the Greek genius after Plutarch. The poem of Nonnus (*Dionysiaca* in 48 books), produced more than 1,200 years after Homer in the Homeric convention of diction, is an extraordinary literary fact. Here, far down the centuries, was a Syrian in Egypt, inditing an epic which is despised only because the past brilliance of Greece obscures it.

#### Procopius and S. Romanos

A sort of final spasm takes place in the epoch of Justinian when Procopius in history, and Palladas in epigram, show themselves competent still to employ intelligently the literary machineries of 1,000 years earlier; and at the same period the Eastern Church astonishes us by breaking out into a Christian lyricism. S. Romanos (b. c. A.D. 500) is an original poet, 1,000 years after Pindar; and from the fountain which he struck out, a stream runs far into the Middle Ages, and by devious channels eventually finds its way

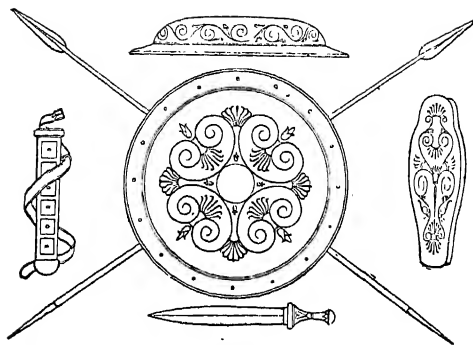


1. Archaic amphora, or two-handled storage jar.  
2. Hydria, or water jar. 3. Kylix, or wine cup.  
4. Amphora, signed by Exekias. 5. Krater, or wine mixer. In black-figure vases the figures were drawn with a dense lustrous varnish, varying from black to

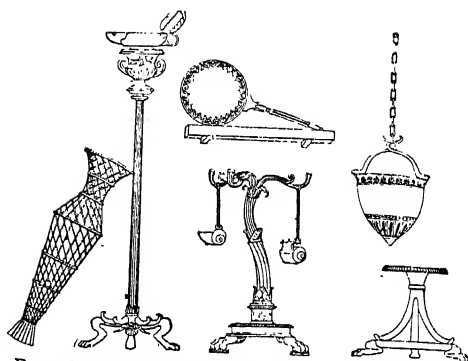
olive-green according to the degree of firing, on fine clay of a rich orange-red colour; white and purple were added for accessories. In red-figure vases, which succeeded them, the figures were left in the ground colour and were thrown up by the black varnish background

**GREEK ART: ATTIC WARES OF THE 6TH TO THE 5TH CENTURIES B.C.**

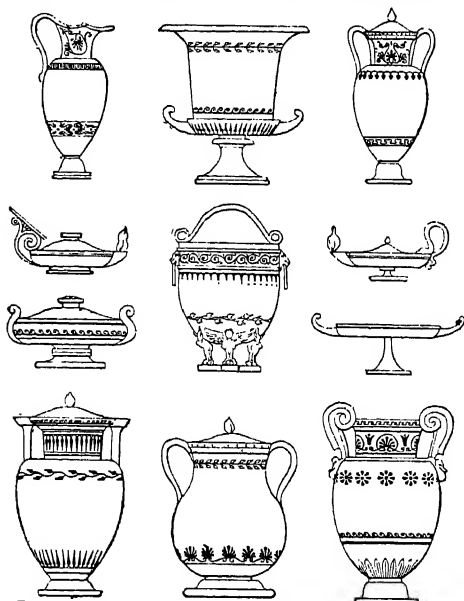
*British Museum*



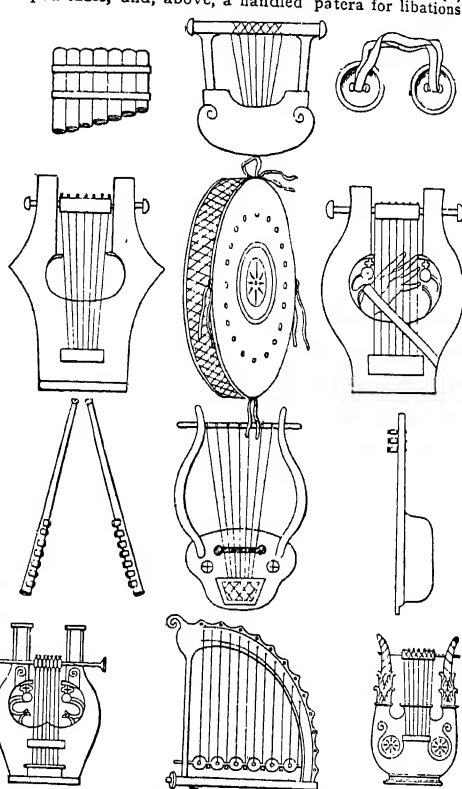
Arms and armour: shield (front and side) and spears, sword and scabbard, and, right, a pair of greaves



Domestic utensils: a basket, standard and hanging lamps, tripod table, and, above, a handled patera for libations



Pottery vessels: five amphorae (two-handled vases); top, left, a wine-jug; two hand-lamps, and, below each hand-lamp, a stemmed drinking cup



Musical instruments: syrinx or pipes, lyres and citharae, crotalon or castanets, tympanum or tambourine, and tibiae or flutes



Fictile vases: amphora embellished with graceful Bacchanalians, entwined swan-headed handles and vine-wreathed neck, and other water-jugs and wine-jugs painted with bulls' heads, human figures, and conventional designs

**GREEK ART: BEAUTY OF DESIGN STILL UNSURPASSED APPLIED TO ARTICLES IN COMMON USE**

into the West, where once more the traditional fertilising power of Greek influence on Latin minds is exemplified.

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**Greek Law.** Term generally applied in a restricted sense to the judicial procedure of the Greek states, virtually to that of Athens, the only city, with the exception of Gortyna (*q.v.*) in Crete, of which a detailed account exists.

At Athens there were various officials who exercised different functions in the settlement of civil and criminal cases. Thus, of the nine archons, the eponymus had the supervision of family disputes, the basileus of religious, especially murder questions, the polemarchus of disputes between resident aliens and foreigners. The court of Areopagus or the 51 *ephetæ*, who sat in different courts according to the nature of the case, tried cases of wilful murder, homicide, and arson.

The Forty, four to each tribe, resembled the English magistrates in petty sessions. They went round the demes, settling unimportant private cases in which the sum involved was less than 10 drachmae (about 8s. 6d.). Otherwise, the matter was handed on by them to one of the *diaetetai* or arbitrators, who formed a sort of court of first instance. If his decision was rejected, he impounded and sealed up all documents and evidence to be reproduced at the regular trial before the *heliastai* or dicasts, the equivalents of the modern jury, by whom most cases, both civil and criminal, were tried in later times. The dicastai were 6,000 in number, 600 from each tribe, and had to be over 30 years of age. The actual number of jurymen, chosen by lot, varied from 201 to 2,501, the odd figure being obviously intended to prevent the number of votes from being equal.

Actions were distinguished as public (*graphê*) or private (*dikê*), although they frequently ran into one another, *dikê* being used to include both. When the state was directly or indirectly affected, this constituted ground for a public

action. Such an action could be brought by any full citizen, except in murder cases, where the nearest relatives were obliged to prosecute, but if he failed to secure one-fifth of the votes, he was fined 1,000 drachmae (about £40) and sometimes in civil cases he had to pay the defendant one-sixth of his claim. Private suits were brought by the person directly affected.

The process went through three stages. The plaintiff summoned the defendant to appear on a certain day before the magistrate who was to preside. The plaintiff handed a written statement of the charge and of the declarations of the witnesses to the magistrate, who decided whether there was a case. Both parties deposited fees (*prytaneia*), which went to the successful litigant. If the defendant failed to appear, judgement went against him by default.

The next step was the preliminary examination (*anakrîsis*). At this the defendant could put in a counter-claim or a plea that, even if the charge made were true, there was some informality which relieved him of the obligation to meet the charge directly. If no such plea were put forward or were rejected by the magistrate, the case was ordered to proceed.

The dicasts, chosen by lot by the officials called *thesmothetai*, assembled in their special court, the Heliæa, the same magistrate presiding. Both plaintiff and defendant delivered speeches on their own behalf, but they were allowed to have advocates to assist them, and their speeches were often written by persons who made a special business of it. The length of time allowed for each speech was measured by the clepsydra or water-clock. The verdict was given by ballot, bronze voting tablets being used, whole for acquittal, pierced in the centre for condemnation. There was no appeal from the verdict, but a new trial could be demanded if it transpired that a witness had committed perjury.

Penalties consisted of capital punishment, inflicted by hurling the condemned into a deep pit near Athens, or by administering hemlock to him in prison; banishment; *atimia* or loss of the privileges of citizenship; confiscation of property; and fines. The execution of the sentence was carried out by various officials, that of death by a body called the Eleven.

Such a method of legal procedure was highly unsatisfactory. The dicasts had no judge's sum-

ming up to influence their verdict; they were not responsible like the regular magistrates, who had to give an account (*euthyna*) of their term of office; all kinds of appeals *ad misericordiam* were made by the litigants, such as bringing in their wives and children dressed in rags. The emoluments, however, appealed to the ordinary citizen, who was able to live on them without doing any other work.

J. H. FREESE

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**Greek Letter Society.** Name given to the secret fraternity of students found in most American colleges and universities. It takes its name from the initials of the Greek words adopted as a motto, and these, with their "grips" and rituals, are the only secrets of these societies. There are more than sixty, each with a chapter of from 20 to 30 members in many different institutions. The total membership of a Greek letter society is sometimes as high as 40,000. The richer chapters have fraternity houses, in which the members live.

Fraternities have been condemned as undemocratic and encouraging cliques and extravagance, laws against them having been actually passed in certain states; but their numbers and property make them important.

The oldest and most famous Greek letter society, Phi Beta Kappa (initials of *philosophia biou kubernêlēs*, philosophy the guide of life), was founded in 1776 at the College of William and Mary, Williamsburg, Virginia. Suspended in 1781 through the successive occupation of Williamsburg by the British, French, and American armies, it survived in the chapters it had established at Harvard and Yale. A branch was inaugurated in England in 1925. It has abandoned its original secrecy, and dropped its social for academic activities. The possession of the "key" (a gold watch-key), its badge, carries no little scholarly prestige. Women undergraduates have founded their own Greek letter societies or "Sororities," numbering in 1947 about 30. Organizations in engineering, law, medicine, and other professions are also designated by Greek letters.

**Greek Religion.** Greek religion is not the same as Greek mythology. The latter is an account of the words and deeds of the superhuman beings called gods; the former is concerned with the nature and functions of these beings, and the worship and ritual by which they were approached.

There is no doubt that the religion of the Greeks, as it appears in the Homeric poems, was preceded by an earlier religion. It has been established that an earlier civilization, to which the name Aegean or Minoan has been given, preceded that of the Greeks. The Greeks themselves are the result of the blending of earlier inhabitants, neither Indo-European nor Semitic, with invaders who descended from central Europe, the last of these being the Dorians. How far Greek religion is an admixture of the beliefs of the original inhabitants with those of the Indo-European invaders; whether the Greeks ever worshipped stones, trees, plants, and animals; what part foreign influences, Asiatic and especially Egyptian, played in the formation of Greek religion as first known to us, are still unsettled questions.

Greek religion was originally neither monotheistic nor merely symbolical of a mystic system brought from the East. Nor was it purely a nature-religion, as was argued from the fact that comparative philology had shown that many of the old Vedic deities, who bore similar names to those of the Greek gods, were personifications of nature. Similarity of name does not necessarily imply a similar conception of the nature of the god. Thus, one who in the Greek hierarchy holds high, even the highest, rank may be insignificant in another.

#### The Greater and Lesser Gods

Greek religion was essentially anthropomorphic. The gods were conceived of as immortal, possessing the forms of men, their vices and virtues, but infinitely superior in power and influence. They may be divided into (1) the gods of the sky, whose home was on Mt. Olympus, ruled by Zeus; (2) the gods of the seas and rivers, ruled by Poseidon; (3) the chthonian gods, or gods of the underworld, ruled by Hades. With these greater gods were associated numerous inferior deities. As the individual gods differed in power and wisdom, so they enjoyed different degrees of veneration in different states. New epithets from time to time indicated altered and extended functions.

The Greek believed himself to be surrounded by gods, upon whom he was himself dependent, and not only he alone, but his family and

the greater family, the state. At the same time he professed nothing in the nature of religious dogma; there was nothing that could be properly called a priesthood, specially gifted with a knowledge of things divine. The Greek could believe what he pleased, except deny the existence of the gods or attack the existing religion.

#### Inexorable Fate

An important element in Greek religion was *Moir*a (Fate), representing the physical and moral laws that inexorably governed the universe, to which even the gods had to bow. Hence it was incumbent upon them to see that men kept and did not violate these laws, and they meted out rewards and punishments accordingly. The relation between men and gods, whose favour was to be gained and whose wrath appeased by various rites and sacrifices, and whose pleasure was learnt from the oracles, was regarded as a sort of contract. If the individual or state required the aid of the gods, they on their part had to give of their best in return.

That the Greeks believed in the existence of the soul after death is shown by propitiatory rites such as were performed, e.g., at the festival called *Antheateria*, by offerings laid on the tomb which the shade of the departed was supposed to haunt, and by the honours paid to distinguished persons or local divinities such as Hercules and the oekist or founder of a colony, who were dignified with the title of heroes.

Up to the time of the Peloponnesian War, the general belief in the gods remained unshaken among the people. After that time, a general moral, social, and political decay set in. The people became impregnated with the scepticism of the philosophers and of dramatists like Euripides. Unbelief and religious indifference took its place, succeeded by superstition, which in turn led to the prevalence of mystical sects and rites like those of the Orphic and other mysteries, and to the introduction of foreign divinities. See Hero; Mystery; Mythology; Oracle; Orphism.

J. H. Freese  
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Religion, J. E. Harrison, 2nd ed. 1908; *Lehrbuch der Religionsgeschichte*, Chantepie de la Saussaye, new ed. 1905, Eng. trans. Manual of the Science of Religion, B. S. Colyer Fergusson, 1891; A Handbook of Greek Religion, A. Fairbanks, 1910.

**Greeley, HORACE** (1811-72). American journalist. Born at Amherst, New Hampshire, Feb. 3

1811, he joined the staff of a country newspaper in his 15th year, and in 1831 made his way to New York as a journeyman printer. After a failure in 1833 with a paper called *The Morning Post*, he founded the *New Yorker* in 1834, the literary excellence of which gained him an immediate reputation. He started *The Tribune* in 1841, and the large circulation of this paper in the N and W. gave Greeley an opportunity of preaching his political doctrines, which included abolition of slavery, temperance, women's rights, protective tariffs. He coined the phrase "Go West, young man."

A founder of the Republican party, he helped to secure Lincoln's nomination in 1860. After the Civil War he favoured a liberal treatment of the South, and was among those who in 1867 stood bail for Jefferson Davis (the president of the Confederacy) when he was charged with treason. Vigorously opposing the re-nomination of Grant in 1872, he was himself nominated by the Liberal Republicans, but carried only six states. He died suddenly in New York, Nov. 29, 1872. *Consult* Life, A. H. Sotheran, 1892; H.G. and the Republican Party, J. A. Isely, 1949.



Horace Greeley. The house in Amherst, New Hampshire, in which he was born

**Greely, ADOLPHUS WASHINGTON** (1844-1935). American explorer. Born at Newburyport, Mass.,



Adolphus W. Greely,  
American explorer

March 27, 1844, he served in the Civil War (1861-65). Remaining in the army, he became a brigadier-general in 1887. He was appointed in 1881 to command a polar expedition,

and with a party of 25 reached the then farthest North (83° 24'), crossing Grinnell Land to the Polar Sea. Two relief expeditions failed to find them, and when the third succeeded, only seven of his party were alive. His *Three Years of Arctic Service*, 1883, gives an account of his expedition.

Greely was largely employed in the signal arrangements of the Spanish-American War, was in charge of the relief operations at San Francisco after the earthquake in 1906, and was promoted major-general the same year. He retired in 1908, and died in Washington, Oct. 20, 1935.

**Green.** River of Kentucky, U.S.A. Rising in the centre of the state, it flows for 300 m. W. and N.W. to the Ohio river, about 7 m. above Evansville. Locks and dams have made the river navigable for small steamers to Greensburg, about 200 m. upstream.

**Green.** Headstream of the Colorado river, U.S.A. Rising on the slopes of the Wind River range in Wyoming, it follows a S. course through the Uinta Mts., in which it has cut a series of deep cañons, and joins the Grand river in the S.E. of Utah to form the Colorado. Its length is about 710 m.

**Green, CHARLES** (1785-1870). British aeronaut. Born in London, Jan. 31, 1785, he interested himself in aeronautics and, on the coronation of George IV, in 1821, was the first to ascend in a carburetted hydrogen gas balloon, from Green Park. After this, he made many ascents, and in 1836 he ascended from Vauxhall in his Great Nassau balloon, taking eight passengers. In 1838 he made two ascents from Vauxhall, attaining 19,335 ft. and 27,146 ft. respectively. His last ascent was in 1852, and he died March 26, 1870.

**Green, JOHN RICHARD** (1837-83). British historian. Born in Oxford, Dec. 12, 1837, he was educated at Magdalen College School and Jesus College. He held an

incumbency at Stepney, but ill-health compelled him to abandon parish work, and for a time he was librarian at Lambeth Palace. He had soon a reputation by contributions to *The Saturday Review*, and from about 1868 devoted himself to historical study. He died at Mentone, March 7, 1883.

Green's great work is his *Short History of the English People*, perhaps the most popular of its kind; it appeared in 1874, and there have been many editions. In this he avoided the conventional historical divisions, and laid more stress upon social and religious movements than upon kings, wars, and treaties. But its great attraction is its style. In the main it is accurate, but its author's knowledge of the later centuries was hardly equal to that of the earlier ones. His *Making of England*, 1882, and *Conquest of England*, 1883, are of value for the Anglo-Saxon period. *Consult* Letters, ed. Leslie Stephen, 1901.

**Green, JULIAN HAETRIDGE** (b. 1900). American author. Born in Paris Sept. 6, 1900, of American parentage, he was educated at the lycée Janson-de-Sailly, Paris, and the University of Virginia, returning to France 1922. At 17 he volunteered for the U.S. ambulance service, at 18 for service with the French army. His first book *Mont Cinère*, a novel about Virginia, appeared in 1925; *Adrienne Mesurat*, 1927 (Eng. trans. *The Closed Garden*, 1928) established him as an author able to create a tense atmosphere of mystery. *Epaves*, 1932; *Le Visionnaire*, 1934; *Minuit*, 1936, followed. His plays—*Sud*, 1953; *L'Ennemi*, 1954; *L'Ombre*, 1956—were equally tense. Volumes of his *Journal* appeared 1938-55; two covering 1928-35 were published in an Eng. trans. *Personal Record*, 1940, in which year he escaped from France to the U.S.A. In 1942 *Memories of Happy Days*, his first book in English, was published, and he was called up for service with the U.S. forces. He settled in France again after the Second Great War.

**Green, THOMAS HILL** (1836-82). British philosopher. His father was a clergyman, and he claimed descent from Oliver Cromwell. Born at Birkin, Yorks, April 7, 1836, he was educated at Rugby and Balliol College, Oxford. In 1860 he was elected to a fellowship at Balliol, and remained in Oxford all his life, being from 1878 professor of moral philosophy. He died March 26, 1882. Green's was the most penetrating influence in

the Oxford of his day, and, through his pupils, on English political and moral philosophy it was profound. In politics he was a Liberal, in some matters an advanced Radical. He took great interest in education and was actively concerned in movements for the betterment of the working classes. As a philosopher he was under the influence of Kant, Hegel, and Fichte. Knowledge to Green was the reproduction of an eternal mind in human personality. The entity which embraces all relations of experience is the infinite, absolute subject, the eternal, pure self-consciousness, the synthetic principle of unity which manifests itself in the individual. His teaching is contained in *Prolegomena to Ethics*, and *Lectures on the Principles of Political Obligation*, both published after his death.

**Green, VALENTINE** (1739-1813). British engraver, born near Chipping Norton, Oxon, Oct. 16, 1739.



Valentine Green,  
British engraver  
After Abbott

He refused to take up law, and studied line engraving under Robert Hancock of Worcester. In London he took up mezzotint, and before he was 30 achieved an unqualified

success. His prints after Benjamin West's *Return of Regulus to Carthage*, and *Hannibal Swearing Eternal Enmity to the Romans*, were the largest mezzotints until then produced. He translated Reynolds's portraits with rare sympathy and skill, and proofs in prime condition now fetch high prices. Green exhibited at the R.A. in 1774, and in 1775 was elected associate engraver and became mezzotint engraver to George III.

In 1789 the elector of Bavaria gave him the sole right to engrave and publish prints after the originals in the Düsseldorf Gallery, but he had completed only 22 plates when the gallery was destroyed in 1798 during the siege by the French. On the foundation of the British Institution in 1805 he was appointed keeper. He died in London, June 29, 1813. His plates number 400, and though he is best known by his portraits, he engraved many subjects by old masters, such as Rubens's *Descent from the Cross*, *Domenichino's Virgin and Child*, *Murillo's S. John with the Lamb*, *Ludovico*



Carracci's Entombment of Jesus, and Agostino Carracci's Venus and Cupid. He also engraved portraits after Van Dyck, Romney, etc.

**Greenaway, Kate** (1846-1901). A British artist. Born in Hoxton, London, March 17, 1846,



Kate Greenaway,  
British artist

she studied at the South Kensington art school, Heatherley's Academy, and the Slade School. Her earlier efforts were limited to valentines and Christmas cards although she exhibited occasionally, for the first time at the Dudley Gallery in 1868, and at the Royal Academy in 1877.

The work with which Kate Greenaway's name is chiefly identified consists of drawings, chiefly in colour, but often in black and white, illustrating stories and poems for children. The girls and boys are garbed in the costume of the early 19th century, and the resulting pictures are quaint and attractive, being saved from the pedantry of archaism by the juvenility of the figures and charm of composition.

Her work enjoyed an immense vogue, and for a long time "Kate Greenaway" frocks were the fashion for little girls.

From 1880 almost to her death at Hampstead, Nov. 6, 1901, not a year passed without several books from her hand. Some she wrote as well as illustrated, such as *Under the Window*, 1879, and *Marigold Marsh*, 1885, the latter perhaps the most commercially successful. *Consult A Century of K. G., A. C. Moore*, 1946.

**Greenbacks.** Popular name for an American legal tender non-interest-bearing paper currency, with devices printed in green ink on the back of the notes. It was first issued in 1862 as a war revenue measure. But when the Treasury began to withdraw these notes under the Funding Act of 1866, so strong an opposition was aroused that its operations were suspended by congress. In 1874

there came into existence a Green-back party opposed to the reduction of the amount of these notes; this party in 1878 sent 14 members to congress. The greenbacks are now a permanent part of the national currency.

**Green Bay.** Opening of Lake Michigan, penetrating for 120 m. S.W. into Wisconsin, U.S.A. It has a greatest breadth of 20 m. and an extreme depth of 120 ft., and derives its name from the colour of its water. The Fox river enters at its head, and its mouth is obstructed by a number of islands.

**Green Bay.** City of Wisconsin, U.S.A., the co. seat of Brown co. A port of entry at the head of Green Bay, on the Fox river, 112 m. N. of Milwaukee, it is served by rlys. Green Bay stands near the site of an old Indian village and was permanently settled about 1745. It was incorporated in 1838 and became a city in 1854. The oldest town in the state, it is the



Kate Greenaway. P Peeped In It, a characteristic Greenaway drawing from the Apple Pie alphabet S. Kensington Museum

seat of the earliest R.C. diocese in the North-West.

An important rly. centre, its harbour is accessible to the largest lake vessels, and a large trade is carried on in coal, lumber, fish, dairy products, and grain. It contains rly. repair shops, lumber yards, paper mills, and canneries, and manufactures agricultural implements, machinery, gas engines, flour, bricks, and tiles. Pop. (1950) 52,735.

**Green Belt.** Rural area surrounding a populous area and protected against development; especially that encircling Greater London. After the First Great War many local authorities sought to preserve the rural areas adjoining large cities; but plans for securing a green belt for London

were interrupted by the Second Great War. In 1945, under the Greater London plan, an area surrounding the city and about 5 m. beyond the suburban ring was designated a green belt, intended primarily for the recreation of Londoners. It was to preserve the North Downs, the Chiltern escarpment, Epping Forest, and Burnham Beeches, as well as certain of the royal and private parks. *Consult Green Belt Cities*, F. J. Osborne, 1946.

**Green Cloth,** BOARD OF. Department of the British royal household. It is presided over by the lord steward, who has under him the master of the household and other officials. It supervises the household arrangements of the court, etc., the office being at Buckingham Palace. It is so called because of the covering of the table at which the lord steward and his subordinates sat.

**Greene, GRAHAM** (b. 1904). British author. Born Oct. 2, 1904, he was educated at Berkhamsted and Balliol College, Oxford. His first novel, *The Man Within*, 1929, foreshadowed the psychological adventure stories which brought him fame: *Stamboul Train*, 1932; *A Gun for Sale*, 1936. *Brighton Rock*, 1938, was a grim, psychological study of a young criminal gangster. The Ministry of Fear, 1943, gave a psychological background to a spy story. *The Power and the Glory*, set in Mexico, won the Hawthornden prize in 1940, and *The Heart of the Matter* received the James Tait Black prize in 1948.

*The Heart of the Matter*, 1948, and *The End of the Affair*, 1951, were in a Catholic context. *The Quiet American*, 1955, was set in Vietnam. His first play, *The Living Room*, was produced in Stockholm 1952, in London 1953. He also wrote *Journey Without Maps* (a trip through Liberia), 1935; *A Mexican Journey*, 1939; and scripts for the outstanding films *The Fallen Idol*, 1948, and *The Third Man*, 1949.

**Greene, HARRY PLUNKET** (1865-1936). British singer. Born in co. Wicklow, June 24, 1865, he was educated at Clifton, and studied singing in Florence and



Graham Greene,  
British author

Stuttgart. He made his début in London as a baritone in *The Messiah*, 1888, and during the 1890s became associated with the Three Choirs Festival, creating the part of Job in Parry's oratorio. In 1900 he sang bass in Elgar's *Dream of Gerontius* at its first performance. In recitals he introduced songs written for him by Stanford and Parry. Professor of singing at the R.A.M. and R.C.M., he was in 1936 on the B.B.C. music advisory committee. Greene, who married a daughter of Parry, published *Interpretation in Song*, and a *Life of Stanford*, both standard works. He died Aug. 19, 1936.

**Greene, NATHANAEL** (1742-86). An American soldier. Born Aug. 7, 1742, at Potowomut, R.I., the son



*Nath Greene*  
From the statue in the  
Capitol, Washington

of a Quaker, on the outbreak of the War of Independence he enlisted as a private in the colonial army. In 1775 he was appointed to command the Rhode Island contingent with the rank of brigadier-general. At the battle of Brandywine he led a reserve force, and in 1780 he was made commander of the army of the South, in which capacity he eventually cleared Georgia and N. and S. Carolina of the British. He died near Savannah, June 19, 1786.

**Greene, ROBERT** (c. 1560-1592). British poet and dramatist. Born at Norwich, he was educated at S. John's College, Cambridge. After leading a dissolute life abroad, he returned to England about 1580. One of the company of "university wits," the first brilliant products of the Elizabethan age, he passed his life in alternate periods of happiness and almost suicidal depression, and died of a surfeit, Sept. 3, 1592.

His writings include pamphlets (in reality short novels) which contain most of his verse and plays; the first appeared in 1583. In a long series of fanciful but dull stories, *Pandosto*, or *The Triumph of Time*, 1588, provided Shake-

speare with the theme of *The Winter's Tale*. Of greater interest are autobiographical pamphlets, e.g. *Greene's Vision*; *Never Too Late to Mend*, 1590; and *Greene's Groatsworth of Wit* bought with a Million of Repentance, published posthumously, 1592, containing a historic reference to Shakespeare as a rising dramatist. His plays include *The Comical History of Alphonsus*; *The Honourable History of Friar Bacon and Friar Bungay*; *The History of Orlando Furioso*; and *The Scottish History of James IV*. *Greene's Works* were edited by A. B. Grosart, 1881-86.

**Greene, WILLIAM FRIESE** (1855-1921). A British inventor. He was born Sept. 7, 1855, at Bristol, and served his apprenticeship in photographic research under J. A. R. Rudge. He exhibited in 1885 moving photographs recorded on a rotating glass disk. In 1889 Greene took out a provisional patent for the first camera and projector, using sensitised celluloid film, and soon made his first picture, views of the traffic at Hyde Park Corner. He then patented his devices for stereoscopic cinematography, 1893, and for colour films, 1898, and was at one time in touch with Edison on a project for talking pictures. Until 1915 Greene lived in poverty. He died suddenly, May 5, 1921, after speaking at a meeting convened by the cinematograph industry.

**Green Earth.** Name given to a dark greenish soft mineral substance, a hydrous silicate rich in iron. It is found chiefly in cavities of eruptive rocks or ancient lavas.

**Greenfinch** OR **GREEN LINNET** (*Chloris chloris*). Common British bird, greenish yellow on the back, with yellow underparts, one of the handsomest of small birds. The female is less brightly coloured than the male. The greenfinch feeds upon grain and seeds, and often rears two broods.

**Green Flash.** A brilliant green coloration, lasting for a few seconds, seen at sunset (or sunrise) under favourable conditions. The phenomenon is due to the unequal refraction of light of different colours; blue and green being refracted more than yellow and red. With the last glimpse of the sun, only green light from the upper limb can reach the observer.

**Green-fly.** Popular name for various species of plant-lice (fam-

ily Aphididae) of the insect order Hemiptera, sub-order Homoptera. They are soft-skinned, with delicate legs and the mouth-parts modified into a fine piercing organ through which they suck continuously the juices of plants. The young are hatched out in a form similar to the adult. Some adults have four exceedingly delicate hyaline wings with only a few strengthening nervures.

After autumn pairing, eggs are laid which hatch in spring, the brood consisting mainly of imperfect, wingless females which, without pairing, bring forth living young. These after three weeks exhibit the same power of virgin production, which is continued through several generations. This power accounts for the enormous and rapid multiplication of green-fly on roses, etc. Most species of green-fly are provided on the upper surface of the hind-body with a pair of tubes through which liquid wax is ejected at their enemies—ichneumon-wasps, lady-birds, and syrphus-flies.

Ants feed on the honey-dew of the aphid, a sweet substance which is its excrement. On account of the advantage thus derived, ants frequently take special care of flocks of green-fly that they place on suitable plants—roots in the case of certain subterranean species. Green-fly may be brown, grey, or black coloured as well as green. Green-fly carry virus diseases from plant to plant in feeding. See *Aphis illius*; *Virus*.

**Greenford.** A residential area of the Middlesex borough of Ealing, England. It is on the Central line. It was styled Greneforde in Domesday Book, and Greenford Magna to distinguish it from Greenford Parva, which has been generally known since the 16th century as Perivale (q.v.). Situated between Southall and Harrow, the manor belonged to Westminster



Greenfinch, a British hedge-row bird

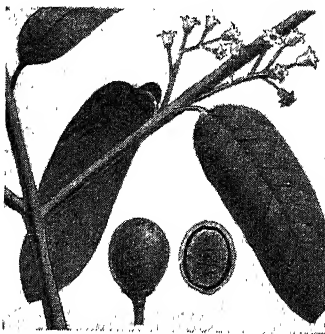
Abbey until the dissolution, and passed in 1550 to the see of London. The rectory and advowson have belonged since 1725 to King's College, Cambridge. The Early Perp. flint and brick church, dedicated to the Holy Cross, and restored 1871 and 1882, contains brasses and old stained glass. A factory, on the Grand Union Canal, still used for industrial purposes, is that in which Perkin perfected his production of

aniline dyes from coal tar. Horsenden Hill, a well-known eminence, is between Greenford Green and Perivale. Pop. 15,244.

**Greengage.** Fruit tree of the family Rosaceae, and genus *Prunus*. The greengage is really a variety of plum and needs the same system of culture. It was first introduced into Great Britain from the monastery of Chartreuse in France, by Lord Gage, and it is supposed that the fruit is one of the primary and necessary ingredients in the preparation of the liqueur which bears the name of the monastery. It is largely grown in France, from which the chief supplies of Great Britain are derived. It is greatly valued as a dessert fruit.

**Green Gland.** The sac-like organ responsible for much excretory activity in crustacea such as the crayfish. It is a truly coelomic space and probably the only vestige of the true coelom, apart from cavities of the gonads, remaining in the crustacea.

**Greenheart** (*Nectandra rodiaei*). Timber-tree of the family Lauraceae. A native of British Guiana, it attains a height of 60 or 70 ft. It has alternate leathery leaves and tubular flowers. Its timber is of great strength and durability, and yields planks of great length,



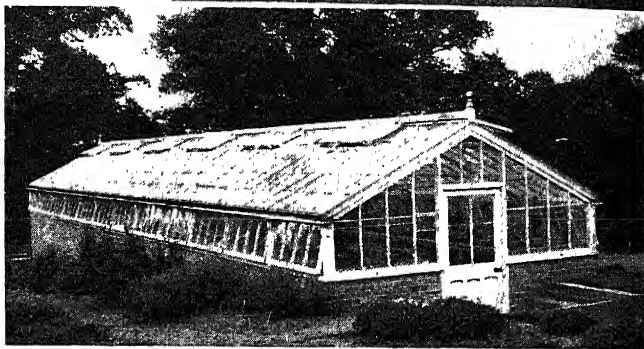
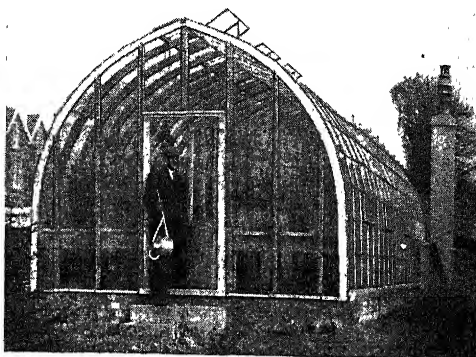
Greenheart. Foliage, flowers, and fruit, with section, of this timber tree

while the ash-coloured bark (Bibiru-bark) is used medicinally in fevers and as a tonic.

**Greenhithe.** Parish and village of Kent, England. It is situated on the Thames, 2½ m. E. of Dartford, with a rly. station. In the vicinity are numerous chalk pits. Ingress Abbey, to the E., on the site of a grange which belonged to Dartford Priory, is a semi-Gothic mansion built partly of stone from old London Bridge. The church of S. Mary the Virgin dates from 1855.

**Greenhouse.** Term applied to a structure of wood and glass

erected for the protection and propagation of plants unable to survive the rigours of winter. The two chief types of greenhouse are the span-roof and the lean-to; the former is built in the open, the latter usually against a wall. They will last



Greenhouse. Span-roof type, the framework made of wood laid on a brick foundation. Top, steel framed greenhouse

indefinitely if the framework is set on a brick wall 2½ to 3 ft. high and if the woodwork is painted from time to time.

The cheaper greenhouse has a base of wood which also must be laid on a brick or concrete foundation to prevent its being in contact with the ground. Steel greenhouses have come into use, and some have been made of concrete. The span-roof type is generally so placed that the ends face N. and S., thus all parts are exposed to light and sunshine. The lean-to type is usually built against a sunny wall, but for the cultivation of ferns a shady wall is best.

The best way to heat a greenhouse is by a boiler and hot water pipes, the heat being supplied by a coke burning furnace built into the wall. An apparatus of this kind will maintain a minimum temperature of about 50° F. Successful management depends largely on maintaining an equable temperature at night and in dull weather, and in so arranging the ventilation that the warmth rises gradually as outdoor temperature increases. The top ventilators must be opened early in the morning in spring and summer, more ventilation being given as the sun's heat increases. As the sun

declines, the ventilation should be reduced, the greenhouse being closed before the sun has ceased to shine on the roof. Watering pot-plants correctly is important; the soil should be moistened only when it is moderately dry and then watered thoroughly. See Conservatory.

**Green Howards.** Infantry regiment raised in 1688 as the 19th Foot and known as the Yorkshire



Green Howards (Yorks Regt.) badge

Regt. (Alexandra, Princess of Wales's Regt.) from 1881 to 1920. The nickname of Green Howards was given because after it was raised it was commanded by Sir Charles Howard and the men wore green facings. Its first honour was gained at Malplaquet, and it fought at Fontenoy. The regiment saw service in America, India, Ceylon, and the Crimea, and after the Tirah campaign of 1897 served throughout the S. African War. Twenty-four battalions were raised for service in the First Great War and gained the honours: Ypres, 1914, '15, '17; Loos, Somme, 1916, '18; Arras, 1917, '18; Messines, 1917, '18; Valenciennes; Sambre;

France and Flanders, 1914-18; Vittorio Veneto; Suvla. During the Second Great War battalions took part in the campaigns in Norway, Persia, Syria, N. Africa, Sicily, Burma, and N.W. Europe. One was converted into a light A.A. battery, another into a parachute battalion, a third into a reconnaissance regiment.

**Greenland.** Large island, mainly within the Arctic Circle, a prov. (until 1953 a colony) of Denmark. Its area is about 826,000 sq. m. It lies north-east of Baffin Island; its most northerly point, lat.  $83^{\circ} 39' N.$ , is about 1,600 m. from its S. extremity in Cape Farewell, lat.  $59^{\circ} 45' N.$  Its extreme breadth is 700 m. The coast is characterised by rugged cliffs, rising sheer from the ocean, with deep and tortuous, fiord-like, glacier-filled indentations, piercing inland in some cases for nearly 100 m. The principal inlets are Independence Fiord, Inglefield Gulf, Disco Bay, Scoresby Sound, Kane Basin, Petermann Fiord, Sherard-Osborn Fiord, and Franz Josef Fiord. The Greenland Sea lies off its E. coast, Denmark Strait separates it from Iceland in the S.E., while Davis Strait, Baffin Bay, Smith Sound, and the Kennedy and Robeson Channels divide it from Ellesmere Island, Devon Island, and Baffin Island on the W.

Nearly the whole of Greenland is an elevated plateau, the mean alt. being 4,500 ft.; but in places there are eminences approaching 10,000 ft. The valleys have been filled in by accumulations of snow, so that its whole area presents a continuous and fairly level ice sheet extending from sea to sea. The largest of the glaciers is the Humboldt in the N.W., reputed to be the largest in the world. It discharges into Kane Basin on a front of 55 m. Other large glaciers are the Great Karaik, the Jacobshavn, and the Petowik, all on the W. coast. The only ice-free areas are on parts of the S.W. and S.E. coasts during summer, when Arctic flora appears, with herbs, shrubs, and mosses in the N. and saxifrages, poppies, heath, anemones, with Arctic birch, alder, and willow, in the S.

The climate is extremely cold and foggy in winter, but during the short summer in the S. the mean temperature is  $48^{\circ} F.$  Animals are not numerous, being represented by the polar bear, reindeer, musk ox, etc. Birds are more plentiful. The inhabitants are Eskimos, found N. of Melville Bay, between Cape York and Etah.

The country is divided into two inspectorates—the southern, which touches lat.  $67^{\circ} 20' N.$ , and the northern, with undefined N. limits. The principal settlements are Upernivik, the most northerly village in the world; Godhavn, on the island of Disco, the capital; Sydproven, Christianshaab, Umanak, Jacobshavn, Sukkertoppen, Frederikshaab, Ivigtut, and Julianehaab. Trade is done in whale and seal, oil, furs, cryolite, and eiderdown. There are extensive fishing grounds round the coasts with cod and haddock as the principal catch.

Greenland was discovered and named towards the end of the 10th

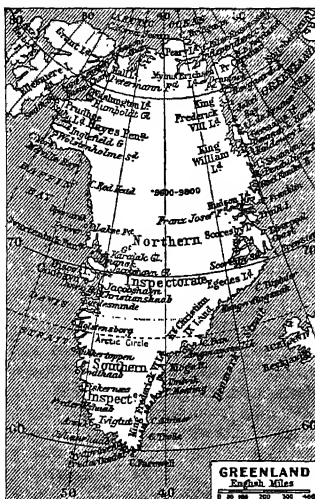
Godthaab on the W. coast. Others followed him, and the pop. in 1951 was 24,159. The largest settlement is Sydproven, and the most important, Godthaab. Journeys across the immense ice-cap by Nansen, Peary, Rasmussen, De Quervain, Koch, and French expeditions during 1948-53 have added much to knowledge of the coast and the neighbouring seas.

On April 10, 1941, the U.S.A. took Greenland under its protection, after learning that German aircraft had been flying over the territory, and obtained permission from the Danish government to establish air, wireless, and meteorological bases. Secret German weather reporting stations were discovered and destroyed. *Consult* The First Crossing of Greenland, F. Nansen, 1891; Greenland, M. Vahl, 1930; Greenland, V. Stefansson, 1943.

**Greenland Sea.** Arm of the N. Atlantic Ocean, lying N. of lat.  $70^{\circ} N.$ , between Greenland on the W., Spitsbergen on the E., and Iceland on the S. Its breadth is about 400 m., and its depth varies from 2,550 fathoms off Spitsbergen to 1,000 fathoms off the W. coast of Jan Mayen. The current from the Arctic Ocean runs down the E. shore of Greenland.

**Green Line.** Coach services between London and the Home counties. The green coaches of this line were introduced by the London Passenger Transport Board in 1930, to provide rapid transport between London and country districts. On Aug. 31, 1939, the vehicles were withdrawn and converted into ambulances, 400 being ready for duty at the outbreak of the Second Great War. Services were again in operation by Dec., 1940, but discontinued once more in Sept., 1942, the coaches doing duty with the civil defence and U.S. army as ambulances and mobile canteens. Services were resumed in 1946, and from 1948 came under the London Transport executive of British Railways.

**Green Mountain Boys.** An irregular military force raised by Vermont (the Green Mountain State) in 1775, mainly to defend its independence against the claims of New York. The principal exploit of this body during the War of Independence was the capture of Fort Ticonderoga, when its leader, Ethan Allen, demanded the surrender of the British garrison "in the name of the great Jehovah and the Continental Congress."



Greenland. Map of the island made a prov. of Denmark 1953; most of it is within the Arctic Circle

century by a Norseman, Eric the Red, who planted a colony on the S.W. coast. His son, Leif Ericsson, when on a voyage from Norway to Greenland, is supposed to have discovered the mainland of America. Christianity was introduced and a bishopric established in the 12th century.

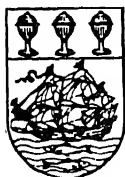
Intercourse with Europe was maintained until the beginning of the 15th century, when the increase of the Arctic ice completely imprisoned the colony and precluded all access. This settlement is said to have extended 200 m. in the S.E. of Greenland, and possessed several churches and monasteries. Nothing certain is known of the fate of the settlers.

In 1585 John Davis visited the country, but found only Eskimos, among whom were a few Norse traditions. In 1721 Hans Egede, a Danish missionary, founded

**Green Mountains.** Northern section of the Appalachian system, U.S.A. The range extends in a N. direction from near the Hudson river in New York through Massachusetts and Vermont. Its general elevation is from 2,000 ft. to 2,500 ft. above sea-level, the highest summits occurring in the N. and centre of Vermont, Mt. Mansfield, 4,364 ft., being the loftiest.

Part of the range forms the watershed of the affluents of the Cumberland river and the streams flowing to the Hudson river and Lake Champlain. Extensive forests of pine, spruce, and other trees cover the slopes of the range, which contains rich deposits of iron, marble, manganese, etc.

**Greenock.** Police burgh and seaport of the county of Renfrew, Scotland. It stands on the S. side of the Firth of Clyde, 22 m. W.N.W. of Glasgow, and is served by rail and steamer. Buses connect it with Port Glasgow on the E. and Gourock on the W.



Greenock arms

The chief buildings include the town hall and municipal buildings, the Watt Institution, Greenock library, and custom house. There are a technical college and other colleges and schools; also several hospitals and charitable institutions. The oldest church is a 16th-century building, now removed to the esplanade. In its churchyard Highland Mary (*q.v.*) was buried, but her remains are now in the cemetery. John Galt lies in Inverkip Street burying ground. There are parks and two golf courses.

The chief industries of Greenock are shipbuilding, marine engineering, and sugar refining. The port has been continuously improved since it was first opened in 1710. There are several harbours, with docks both wet and dry, and a great extent of quays and other accessories of a first-class port; also great shipbuilding yards. Manufactures include leather, worsted, rope, tin and aluminium products, wooden boxes, coal-cutting machinery, electrical accounting machines. Greenock became a burgh in 1635, and a flourishing seaport after the union of Scotland with England in 1707. Here James Watt was born, and on the site of his birthplace is the Watt engineering, navigation, and wire-

less telegraphy school; the burgh was also the birthplace of Captain Kidd, the pirate. It is governed by a corporation, and forms a burgh constituency. Pop. (1951) 76,292.

During the Second Great War, Greenock, with the adjoining port of Gourock, became the largest base of the Royal Navy and an embarkation port for those going overseas. It suffered only two nights of severe air raids, May 6 and 7, 1941. The naval dockyard was closed in 1946; in the same year a memorial to the Fighting French navy was unveiled here.

**Greenockite.** Ore mineral of cadmium, cadmium sulphide (CdS). Rarely in hemimorphic crystals, differently terminated at the two ends, and translucent to transparent, it occurs usually as a yellowish earthy coating associated with zinc minerals, commonly sphalerite. Greenockite has been prepared artificially and is not uncommon as a furnace product.

**Greenore.** A seaport of co. Louth, Irish Republic. on the N. side of Carlingford Lough, 2 m. S.E. of Carlingford. It has a rly. station, and was formerly a mail packet terminus of a service from Holyhead. Pop. 765.

**Green Park.** Open space in London. It covers 54 acres between Piccadilly and St. James's Park and Constitution Hill. A favourite resort of Charles II, it had a notoriety for duels, the duchess of Cleveland witnessing a combat here in 1696 between her lover Fielding and Sir Henry Colt. Queen Caroline's library was in the park, but was pulled down for the purpose of erecting Stafford House.

**Green Pastures, THE.** Play by Marc Connelly. Based on Roark Bradford's novel *Ol' Man Adam an' His Chillun*—the Bible story as visualised by a negro preacher—this allegory aroused much controversy when it was produced on the New York stage in 1930, but was awarded the Pulitzer prize. A screen adaptation in 1937 was memorable for Rex Ingram's performance as De Lawd. As the play transgresses the rule against any stage impersonation of God, the Lord Chamberlain's office has not been able to permit public performances in Great Britain; but the film was shown, and a radio version was broadcast by the B.B.C.

**Green Rod, THE USHER OF THE.** An officer of the order of the Thistle. Green Rod accompanies knights of the Thistle at a corona-

tion, and at other ceremonies, as an attendant. His status corresponds to that of Black Rod (*q.v.*).

**Greensand.** Two series of beds of sands and sandstones which form the lower part of the Cretaceous system. Known as upper and lower, in Kent and Surrey they are separated by a clay development, the Gault. The prevailing green colour is due to grains of glauconite scattered through the beds. Lower Greensand is well developed in the Isle of Wight, where the beds are 100 ft. thick, and in S.W. England, and also forms a rim round the Weald. At Leith Hill, Surrey, they reach an elevation of 965 ft. The thickness and character of the beds are variable. Greensand makes good building stone, as characterised by Bargate stone, near Reigate, and Kentish Rag, near Maidstone. The beds extend from Wiltshire through to Cambridgeshire, often as yellow and brown sands, with ironstone. Upper Greensand is quite distinct from Lower in its fossil contents. See Cretaceous; Gault.

**Greensboro.** A city of North Carolina, U.S.A., the co. seat of Guilford co. It is 80 m. W.N.W. of Raleigh, and is served by the Southern rly. and an airport. It contains the women's college of the state university and three colleges for negroes. A large trade in tobacco, maize, cotton, and lumber is carried on, and there are manufacturing plants for cotton goods, machinery, carpets, and flour. Greensboro was founded in 1808, named after Gen. Nathaniel Greene, who won a battle here in 1781, and received a city charter in 1870. Pop. (1950) 74,389.

**Greensburg.** City of Pennsylvania, U.S.A., the co. seat of Westmoreland co. It is 31 m. E.S.E. of Pittsburgh, and is served by the Pennsylvania rly. On a coalfield and with natural gas resources, it has rly. shops, coke ovens, and makes metal products. Greensburg was settled in 1771 and incorporated 1809. Pop. (1950) 16,928.

**Greenshank** (*Tringa nebularia*). Wading bird of the snipe family, so called from its olive legs. It visits Great Britain in autumn and winter, and is most common in the N. of Scotland, where it is usually found by the shore, feeding on small crustaceans and molluscs.

**Greenstick Fracture.** Term describing a break in a young bone which bends without fission after the manner of a sapling.

**Greenstone.** Name applied by geologists and miners to altered basic igneous rocks such as basalt

or dolerite. The alteration of the original rock produces such minerals as epidote and chlorite, which give the characteristic dark green colour.

**Greenville.** City of S. Carolina, U.S.A., the co. seat of Greenville co. It stands on the Reedy river, near the foot of the Blue Ridge Mts., 160 m. N.E. of Atlanta, and is served by rlys. and an airport. It contains Furman university and a women's college. Settled 1776, incorporated 1831, it became a city 1868. Pop. (1950) 58,161. Another Greenville, in Mississippi, is the co. seat of Washington co.; pop. (1950) 29,936.

**Greenwell, Dora** (1821-82). A British author. She was born at Greenwell Ford, Durham, Dec. 6, 1821, and died March 29, 1882. Her work, while individual, has much in common with that of Christina Rossetti. Marked by deep religious feeling, it touches ancient myths and medieval legends; it caught from Greek exemplars a love of beauty, a flair for the simple but subtly expressive word, an acute sense of the enigma of life; and its musical quality bespeaks the author's love of German lyric and Provençal and Italian rhyme.

In *Carmina Crucis*, 1869, her treatment of the story of Persephone is typical; in the poem *Poet and Painter* (Lucretius and Leonardo da Vinci) she contrasts differing forms of unbelief; in *Camera Obscura*, 1876, the poem *Between Two Worlds* embodies a vision of the passing dead in terza rima of haunting impressiveness. She touched the heroic in her *Song of Roland*, *The Battle Flag of Sigurd*, and *The Flaming Oar*. Her prose work included memoirs of Lacordaire, 1868, and John Woolman, 1871; *The Patience of Hope*, 1860. *Essays*, 1866; and *Colloquia Crucis*, 1871. *Consult Life*, C. M. Maynard, 1926.

**Greenwich.** Metropolitan bor. of London. It is on the right bank of the Thames, 6 m. S.E. of the City of London by rly. and connected with the Isle of Dogs (q.v.) by a tunnel, opened in 1902, for foot passengers and by Blackwall Tunnel (q.v.) with Blackwall.

There is omnibus communication with the City. The borough is bounded W. by Deptford, S. by Lewisham, and E. by Woolwich. Sixth in size of the London bors.,

it contains the Naval College, the National Maritime Museum, the Herbert and Brook Hospitals, the parish church, and several almshouses. Its open spaces include Greenwich Park, 185 acres; part of Blackheath, 267 acres; and part of Woolwich Common. There are telegraph, engineering, and chemical works. Notable inns are the Trafalgar, and the Crown and Sceptre. (See also Greenwich Hospital; Greenwich Observatory, Royal.)

Once a Danish encampment, Greenwich was originally, and for centuries, a small fishing town. The manor, once the property of the abbey of S. Peter, at Ghent, was transferred to the Carthusian priory at Sheen, and was later given to Humphrey, duke of Gloucester, who enclosed a park of 200 acres, rebuilt the palace on part of the site now occupied by Greenwich Hospital, and erected a tower, Greenwich Castle, on the hill where the Observatory stands. Henry VIII, who was born and baptized at Greenwich, here married Catherine of Aragon. His daughters Mary and Elizabeth were born and his son Edward VI died here. James I settled palace and park on his wife Anne of Denmark. Charles I lived at Greenwich until the outbreak of the Civil War; Cromwell resided here, and at the Restoration the place once again reverted to the crown. The palace was partly rebuilt, and formed the nucleus of the hospital.

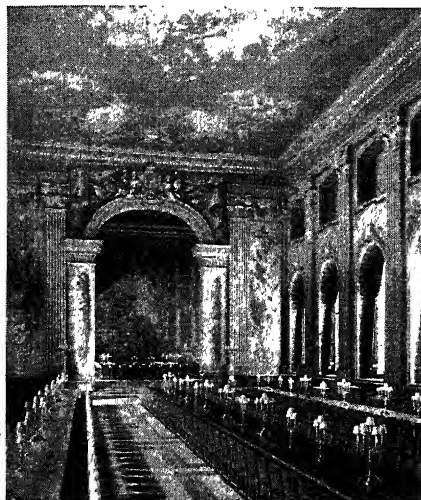
The parish church, dedicated to S. Alphege, who was martyred here by the Danes in 1012, was rebuilt in 1718; it was badly damaged by fire after an air raid of the Second Great War, which caused heavy destruction in all parts of the borough. Lavinia Fenton, duchess of Bolton, was buried in the churchyard in 1760. Dr. Johnson lived in Church Street in 1737. Down to 1857, two fairs, notable for their boisterousness, described by Dickens and Thackeray, were held annually at Easter and Whitsun. Greenwich forms a bor. constituency. Pop. (1951) 91,492. *Pron.* grin'-itch.

**Greenwich.** Town of Connecticut, U.S.A., in Fairfield co. It stands in a picturesque position on Long Island

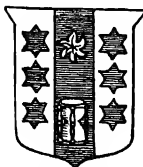
Sound, 27 m. N.E. of New York City, at the S.W. extremity of the state, and is served by rly., besides having connexion with New York by steamer and electric rly. A residential district for artists, writers, and business men, and a holiday resort, it is noted for oysters. It was settled in 1614. Pop. (1950) 40,835.

**Greenwich Hospital.** British institution founded for aged and infirm sailors, and since 1873 the home of the Royal Naval College. Situated on the right bank of the Thames, 5 m. below London Bridge, it occupies the site of an old royal palace, and of its successor, built by Humphrey, duke of Gloucester, and named by him Placentia. Charles II, in 1667, began to rebuild the palace from designs by Inigo Jones and Webb, but only one wing was completed. Building was resumed under William III and Anne, from designs by Wren. In 1705 the new buildings were opened as a seamen's hospital, in memory of the naval victory of La Hogue, and of Queen Mary, consort of William III. In 1934 the National Maritime Museum was established in the Queen's House.

The buildings consist of several groups. The original design of the massive river façade is ascribed to Webb. To a second group belong the completion and extension of the river façade, and the S. blocks, which were designed by Wren, with fine colonnades and the W. and E. domes. (See *Architecture illus.*, p. 552, and *Flood-lighting illus.*). The E. dome was completed by Hawksmoor. To



Greenwich Hospital. The painted hall, designed by Wren and embellished by Sir James Thornhill



Greenwich arms



the second group belongs also the painted hall, once the dining hall, designed and carried out by Wren. The pavilions at each extremity of the terrace were built in 1778. The King Charles buildings are divided from those of Queen Anne by a great square on the river front.

Beyond the square are the hall and chapel, each with a beautifully proportioned dome. Other buildings are the old infirmary, now the Seamen's Hospital; and the Royal Hospital School, the central part of which was designed by Inigo Jones. The painted hall contains relics of Nelson and other naval men. The chapel, burnt in 1779, was rebuilt 1779-89, and restored 1851 and 1882. The N. and S. fronts of the hospital are of Portland stone, and the W. of brick. *See also Maritime Museum.*

**Greenwich Mean Time.** Artificial measure of time in use at the Royal Greenwich Observatory. To meet variations of solar and sidereal time, an artificial measure, computed from sidereal time, presupposes the earth to be travelling round the sun at its actual constant speed, but without any allowance being made for variations of the earth's motion on its axis. G.M.T. is accepted throughout the world as standard; and ships' chronometers are regulated by the Greenwich time signal. The B.B.C. transmits the same signal, the last of six pips giving the exact moment of G.M.T.

**Greenwich Naval College.** *See Royal Naval Colleges.*

**Greenwich Observatory.** ROYAL. Astronomical institution, directed by the English astronomer royal, at Herstmonceux (or Hurstmonceux) Castle, Sussex. It was founded at Greenwich in 1675 by Charles II to make the observations of the sun, moon, planets, and stars then needed to perfect the art of navigation—observations it continues to make for astronomical reasons. It also comprises departments devoted to the measurement and distribution of time, to astrometry, to astrophysics, to the study of the sun, and to the observation of the earth's magnetic field. Non-observing sections comprise the chronometer department, which issues and repairs the navigational timepieces used in the Royal Navy and the R.A.F., and the Nautical Almanac Office, which calculates the Nautical Almanac, the Air Almanac, the Star Almanac, and other related publications.

The original building was designed by Wren and built for the

first astronomer royal, Flamsteed, on a hill in the gardens (now Greenwich Park) of the royal palace at Greenwich. Wren's Octagon Room was added to by later astronomers royal, perhaps the most celebrated addition being the transit circle pavilion designed by Airy in 1851: through this building passes the zero meridian of longitude, adopted by international



Greenwich Observatory. On the right is the original building designed by Wren for Flamsteed, first astronomer royal; the other structures are extensions added up to 1899

agreement in 1884; the world system of time zones is based on Greenwich mean time (*v.s.*)

By the middle of the 20th century the growth of London, with its smoke and artificial lights, had made Greenwich an unsuitable centre for astronomical observation, and the large telescopes, dismantled for safety at the beginning of the Second Great War, were re-erected in the ground of the 15th-century Herstmonceux castle, 1948-57. The castle contains the astronomer royal's residence, the secretariat, the meridian, solar, and magnetic departments, and the library. In the surrounding grounds an office block was built to house the Nautical Almanac Office, time department, astrometry and astrophysics departments, chronometer department, and workshops; buildings containing an 8-in. reversible transit circle, a photographic zenith tube, a small transit instrument, and a photoheliograph; and an equatorial group housing a 30-in. and a 36-in. reflecting telescope, a 28-in. visual refractor, etc., with associated laboratories and darkrooms. Astronomical observations and time signals were referred back to the meridian of Greenwich.

Magnetic observations, removed in 1925 to Abinger, Surrey, because of interference from electric trains, were again transferred in 1957, for a similar reason, to Hartland in Devon.

The old buildings at Greenwich were taken over in 1953 by the National Maritime Museum and

opened to the public as a navigational and astronomical annexe.

**Greenwich Village.** District of New York, bounded by W. 14th St., Greenwich and 6th Avenues, W. Houston St., and the Hudson River. It has no rural characteristics. Inhabited in the main by artists and authors, it suggests a blend of Chelsea and Bloomsbury, with perhaps a touch of Grub

Street. Here is the Whitney museum of American art.

**Greenwood, HAMAR GREENWOOD, 1st VISCOUNT (1870-1948).** British politician. Born Feb. 7, 1870, at Whitby, Ont., Canada, he was educated there and entered the state agricultural dept. He then came to England, sat as Liberal M.P. for York, 1906-10, and Sunderland, 1910-22, and was under-secretary for home affairs in 1919. Chief secretary for Ireland during the critical years 1920-22, he bore the responsibility for many repressive measures adopted in Ireland by the British government. He was Conservative M.P. for E. Walthamstow 1924-29. He was made a baronet 1915, a baron 1929, a viscount 1937, and died Sept. 10, 1948.

**Greenwood, ARTHUR (1880-1954).** British politician. He was born at Hunslet, Leeds, Feb. 8, 1880, and educated at University College, Leeds (then part of Victoria University). He became a lecturer in economics at Leeds University and took an active part in the workers' educational movement. He entered parliament in 1922 as Labour M.P. for Nelson and Colne, was minister of Health in the second Labour government of 1929-31, and sat continuously for Wakefield from 1932. Having



Arthur Greenwood, British politician

been deputy leader of his party, Greenwood was minister without portfolio responsible for the study of post-war reconstruction in the Churchill cabinet, 1940-42, and lord privy seal in the Attlee cabinet of 1945. He was paymaster-general in 1946 and again minister without portfolio in 1947. A privy councillor from 1929 and C.H. from 1945, he died June 9, 1954.

**Greenwood, FREDERICK** (1830-1909). British journalist, born in London, March 25, 1830. He was first editor of *The Queen*, 1861-63; assistant editor, with G. H. Lewes, 1862-64, and then editor, 1864-68, of *The Cornhill Magazine*; and first editor of *The Pall Mall Gazette* from 1865. When in 1880 its proprietors and politics were changed, he and his staff resigned, and started *The St. James's Gazette*, of which he was editor until 1888. He founded and edited *The Anti-Jacobin*, 1891-92. He died at Sydenham, Dec. 14, 1909.

Greenwood devoted special study to foreign affairs, was a strong opponent of Gladstone's anti-Turkish policy, and suggested to Beaconsfield the purchase by Great Britain of Ismail Pasha's Suez Canal shares. Of his novels the best is *Margaret Denzil's History*, 1864. He wrote *The Lover's Lexicon*, 1893, and *Imagination in Dreams*, 1894. He figures as Richard Rookney in Meredith's *Celt and Saxon*.

**Greenwood, THOMAS** (1851-1908). A British librarian. Born near Stockport, May 9, 1851, he began business life as a clerk in a hat works, and then became a library assistant at Sheffield. He founded in London a number of trade journals, wrote a biography of Edward Edwards, the librarian, 1902, and was the author of *Public Libraries, Their Organization, Use, and Management*, 1886, 5th ed. 1894. He formed a large bibliographical library, which, with the library of Edwards, he presented to Manchester. Greenwood died at Elstree, Nov. 9, 1908.

**Greenwood, WALTER** (b. 1903). British novelist and dramatist. Born at Salford, Dec. 17, 1903, he became a pawnbroker's clerk at 12 and held a succession of ill-paid jobs. Having lived on the dole during periods of unemployment, he wrote in 1933 a novel, *Love on the Dole*, which, adapted for the stage, and produced at the Garrick Theatre, London, 1935, achieved over 390 performances; a screen version appeared in 1941. Another play was *Give Us This Day*, 1936. A film, *Six Men of*

*Dorset*, 1944, was based on the story of the Tolpuddle Martyrs.

**Greenwood Case.** Sensational trial at Carmarthen assizes, Nov. 2-9, 1920, of a Kidwelly solicitor who was charged with administering arsenic to his wife. He was defended by Sir Edward Marshall Hall, K.C. The trial was remarkable for the extreme conflict of evidence, and for the weakness of the evidence for the prosecution, and it brought out strongly the defects of the circuit system, under which the accused man was kept in prison more than four months awaiting his trial on a capital charge, before his acquittal at the hands of the jury.

**Greet, SIR PHILIP BEN** (1857-1936). A British actor-manager. Born Sept. 24, 1857, on a training ship in the Thames which his father commanded, he was educated at the Royal Naval School, New Cross. In 1879 he first acted at Southampton, and after playing in London, entered on management in 1886. For 25 years he toured with Ben Greet companies, chiefly in Shakespeare, and settled in New York, 1902-14. Associated with Shakespeare productions at the Old Vic, 1914-18, the staging of English plays in Paris, 1924-26, and the origins of the Open Air Theatre, Regents Park, he was knighted in 1929. He died May 17, 1936.

**Gregale.** Name given to a dry N.E. wind which blows over Malta. It has been identified with the Bora, which often rages with great severity in the Adriatic, and the Euroclydon, which wrecked S. Paul's ship (Acts 27).

**Gregarines.** Parasitic protozoa, found in the bodies of invertebrates, chiefly the arthropods. There are a large number of species, among the more important being those found in the earthworm, lobster, cockroach, and cuttlefish. The effect of the presence of these parasites on the bodies of their hosts is as a rule slight. See Sporozoa.

**Gregg, JOHN ALLEN FITZGERALD** (b. 1873). An Anglican divine. He was born July 4, 1873, and educated at Bedford School and Christ's College, Cambridge. Appointed curate of Ballymena, 1896, he became a canon of S. Patrick's cathedral, Dublin, and chaplain to the lord lieutenant, 1912. He was Archbishop King's professor of divinity at Trinity College, Dublin, 1911-15, and held the sees of Ossory, Ferns, and Leighlin, 1915-20. He was archbishop of Dublin, 1920-38, and was

appointed archbishop of Armagh and primate of all Ireland, 1939. He was made C.H. 1957.

**Grégoire, HENRI** (1750-1831). French bishop and revolutionary. Born of peasant stock at Vého.



Henri Grégoire, French revolutionary

clerics who joined hands with the third estate. With the latter he attacked the privileges of the clergy, though firmly maintaining his Catholic beliefs, and, under the new civil constitution of the Church, was elected bishop of Blois, 1791. In 1792 he strongly advocated the abolition of the monarchy, and became president of the convention in Nov.

During the consulate he continued to work for ecclesiastical reform, but, opposing Napoleon's concordat with Pope Pius VII, resigned his bishopric in 1801. In the senate he vainly opposed the establishment of the empire, and worked against it during its last months in 1814. After the Bourbon restoration, however, he was forced to live in retirement. In 1819 he was elected to the chamber for Isère, but the election was quashed by a special vote. Grégoire finally retired and wrote on ecclesiastical history. He died at Auteuil, May 28, 1831.

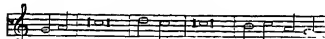
**Gregorian Calendar.** Calendar introduced by direction of Pope Gregory XIII in 1582. The pope declared that Oct. 5 that year should be called Oct. 15 and ten days omitted. It was a reform of the Julian calendar, but was not adopted in Great Britain until 1752. See Calendar.

**Gregorian Chant.** Term applied to the plainsong system used in the rendering of the music of the services of the church as supervised and settled by S. Gregory. The principal eight modes or tones may be described as represented by the white notes alone of the pianoforte, with the exception of an occasional B flat to avoid the harshness of the tritone. The four authentic modes are No. 1 (Dorian, D to D), No. 3 (Phrygian, E to E), No. 5 (Lydian, F to F), and No. 7 (Mixolydian, G to G). Coupled with each of these but lying a fourth lower, is a plagal mode distinguished by an even

number and having the prefix hypo to the Greek term. Each pair has the same final, but a different



The same in modern notation



Gregorian Chant. Tone VIII, 1st ending, with transposition into modern notation

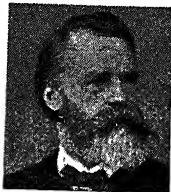
dominant, i.e. the note to which the recitation is chanted. The dominant of an authentic mode is the fifth degree except when, as in No. 3, that happens to be B; then the dominant is the sixth. The dominant of a plagal mode is a third lower than that of its associated authentic mode, except that C takes the place of B as before.

Structurally, the chant begins with an intonation, used in every verse of the Canticles, but only in the first verse of the Psalms, followed by a reciting note (dominant) and a melodic extension called the mediation. This closes the first portion of the chant. The second begins with a reciting note (dominant again), and concludes with a melodic extension called the ending. Each of the tones has various endings. It is not necessary that the ending should close on the final; but this is always supplied by the antiphon which precedes and follows each canticle or psalm.

In addition to the eight principal tones others are sometimes used. The only difference lies in the notes taken as finals and dominants. As in all plain-song, the music is noted on a four-line staff with either the F or the C clef, and for performance is transposed to any convenient pitch. See Ambrosian Chant.

**Gregorius.** Name taken by the Syrian Abulfaraj (*q.v.*).

**Gregorovius, FERDINAND** (1821-91). German historian. Born at Neidenburg, E. Prussia, Jan. 19, 1821, he was educated at Königsberg, and became a teacher. He passed much of his life, however, in Italy, and his great work is his History of Rome in the Middle Ages. Accurate, detailed and scholarly, this monumental work in many volumes traces the history of the city, and with it of the papacy, from about 400 to 1534 (Eng. trans. A. Hamilton, 1894-1900). Gregorovius wrote a number of other historical works, includ-



Ferdinand Gregorovius, German historian

ing a Life of the Emperor Hadrian (Eng. trans. R. Martineau, 1855), and some poems. He died at Munich, May 1, 1891.

**Gregory.** Salt lake of S. Australia. It lies between Lake Eyre and Lake Blanche in lat. 29° S. and long. 139° 10' E. Its length is 40 m., and maximum breadth 10 m.

**Gregory THE ILLUMINATOR** (c. 257-332). Apostle of Armenia and saint. Descended from the royal race of Parthia, his family were killed in revenge after his father, Anak, had assassinated the king of Armenia. The boy was educated as a Christian at Caesarea, and later returned to Armenia, probably about 290. He is said to have been imprisoned there for 14 years, and to have been released as a reward for healing King Terdat (Tiridates) of a disease. He later became the head of the Armenian Church, but gave up office in 331 and spent the rest of his life in a cave.

**Gregory NAZIANZEN** (c. 330-390). Saint and father of the Eastern Church. He was a native of Nazianzus, in Cappadocia, of which place his father became bishop. His mother was a woman of deep piety. He studied at the two Caesareas, Alexandria, and Athens, and had Julian, afterwards Roman emperor, for fellow student, and Basil for friend. He assisted his father at Nazianzus, was made bishop of Sasima, was elected bishop of Constantinople, and, one of the most eloquent orators of the early church, became famous for his defence of the Nicene faith and his opposition to Arianism and Apollinarianism. Jerome was one of his pupils.

His consecration as bishop of Constantinople took place in 381, but the Macedonian and Egyptian bishops contending that the canons of Nice limited a bishop to one diocese, he resigned and spent the rest of his life in his birthplace. His writings include letters, which abound in beautiful thoughts, poems, and 45 orations which won for him the title of Theologian. The best edition of his works is the Benedictine, Paris, 1778-1840. *Consull* memoir, C. Ullmann, 1825. Eng. trans. G. F. Cox, 1857.

**Gregory OF NYSSA.** Greek saint and father of the church. Born at Caesarea about 331, the younger brother of S. Basil, who brought him up, he taught rhetoric for some years, after which he was ordained, and about 371 was appointed bishop of Nyssa in Cappadocia. In 375 he was deposed on a false charge of misappropriating church funds, three years later he was restored to his see, and took part in the Councils of Constantinople in

381 and 394. He probably died in 396. His numerous writings all dealt with theological and ecclesiastical questions.

**Gregory OF TOURS** (538-594). Frankish historian. Born at Clermont-Ferrand, Nov. 30, 538, he was educated for priesthood. In 573 he was made bishop of Tours, a position which gave him a standing in the Frankish realm. The civil wars of the time were constantly at his doors, but he seems to have been equal to most emergencies. He died, Nov. 17, 594. Gregory wrote in Latin several works, but only his History of the Franks is of any importance. The early part of this is mainly legend and tradition, but for the 6th century, when the author narrates contemporary or nearly contemporary events, it is perhaps the most valuable authority extant.

**Gregory.** Name of 16 popes. Gregory III, pope 731-41, was a Syrian whose reign was troubled by Lombard invasions. Gregory IV, a Roman pope, 827-44, was involved in the feuds of the Frankish emperor, Louis the Pious.

Gregory V, pope 996-99, the nominee of his cousin, the emperor Otto III, was the first German pope. Gregory VI received the papacy from his godson, the youthful profligate pope, Benedict IX, April, 1045, in exchange for a large sum of money. Benedict subsequently regretted his resignation, an anti-pope Sylvester III put in a claim, and the Roman clergy appealed to the German king, Henry III, to establish order. Benedict and Sylvester were banished, and a synod at Sutri, Dec. 1046, declared that Gregory had become pope through simony. Henry then arranged that a German, Clement II, should be elected pope, and Gregory resigned. He died in Germany early in 1048.

**Gregory I CALLED THE GREAT** (c. 540-604). Pope 590-604. Born at Rome, he was the son of Gordi-



Gregory the Great, Pope, 590-604

anus, a Roman patrician. About 574 he threw up a promising worldly career—he held the office of prefect of the city the previous year—to become a monk. His family estates in Sicily were given up for the foundation of monasteries, and his home on the Caelian Hill was converted into a religious house dedicated to S. Andrew, where Gregory lived in retirement for some years.

In 578 Pope Pelagius II ordained

him one of the 7 deacons of the city, and the following year dispatched him on a special mission to Constantinople with the object of obtaining help from the emperor against the Lombards now actively threatening Rome.

On his return to Rome after six years' absence, he devoted himself to teaching and literary work; this period is also marked by the incident, related by Bede, of his meeting the English youths in the Forum which fired him with the project for the conversion of England. His original idea was to go himself, and he had actually started when the pope, to whom Gregory acted as confidential secretary, prompted by the Romans, sent urgent messages desiring his return. In 590 he became pope, and in 596 he sent Augustine to Britain. Gregory's remarkable gifts of management and organization were displayed in his scheme of relief for the needs of the refugees thronging Rome, no less than by the reorganization of the vast estates constituting the patrimony of the Church. He gave his name to that mode of plain chant (Gregorian) which, supplanting previous modes, became pre-eminently the music of the Church.

Gregory's Letters (collected in 14 volumes) are a witness to his unceasing labours in the supervision of the whole Church, not merely as a firm upholder of the supremacy of the papacy over East and West, but as overseer of local ecclesiastical affairs, the election to vacant sees, and the holding of local synods.

The first monk to become pope, Gregory's influence tended naturally to enhance the importance of the monastic system and to bring it into closer relationship with the Church. The action which placed Gregory at variance with the Byzantine emperor when the former took upon himself to arrange terms of peace with the Lombard chiefs, marks a distinct stage in that process by which the papacy arrived at temporal sovereignty.

The weight and influence lent to the papacy by Gregory's pontificate gained Gregory his title of Great. He was canonised by popular acclamation immediately after his death, March 12, 604, and ranks as a doctor of the Church. His festival is kept March 12 throughout the Roman Catholic Church. Gregory's special emblem in art is a dove which, according to the story, was seen sitting on his head as he dictated his Homilies. See Augustine; Papacy; consult also Pope Gregory the Great and his Relations with Gaul, F. W. Kellott, 1889; Gregory the Great, J. Barnaby,

1892; Gregory the Great, His Place in History and Thought, F. H. Dudden, 1905.

**Gregory II** (d. 731). Pope 715-731. A Roman, of the Savelli family, he started his ecclesiastical career as



Gregory II,  
Pope, 715-731

a pupil in the papal *Schola Cantorum*. Under Sergius I (687-701) he was made sub-deacon and papal almoner (*sacellarius*) and later papal librarian. After becoming pope he was visited by the Englishman Winfrid or Boniface, whom the pope authorised to preach to the heathen "on the right bank of the Rhine." Gregory II died Feb. 11, 731.

**Gregory VII** (c. 1025-85). Pope 1073-85. His name was Hildebrand, and he was born in Tuscany of obscure and, probably, humble origin. Educated at the Clunian monastery on the Aventine Hill, Rome, where his uncle was abbot, he was created cardinal-deacon by Pope Leo IX, and administrator of the papal estates, where he proved the possession of those gifts of administration which distinguished his later rule.

Resisting the attempts of the Romans to make him pope on the death of Leo IX, he managed to secure the nomination of his candidate who became pope as Victor II in 1054. The latter was succeeded in 1057 by Stephen IX, who died while Hildebrand was engaged on an embassy to Germany. It had been the pope's wish that Hildebrand should succeed him, and he forbade an election to take place until after Hildebrand's return, but a faction seized the opportunity to set up a pretender, who assumed the title of Benedict X. The pseudo-pope was, however, disposed of by the prompt action of Hildebrand, whose own candidate again ascended the papal throne as Nicholas II.

A succession of German popes had tended to increase the imperial influence, particularly in the matter of elections to the papal throne, to a dangerous extent. A decree now promulgated vested the right of electing a pope in the college of cardinals, thus placing the appointment alike out of the power of the emperor no less than

out of that of the Roman patricians with their factions. On the death of Pope Nicholas in 1061, the malecontents among the Italian factions set up an anti-pope who, under the title of Honorius II, created a schism which lasted three years. Eventually Hildebrand's candidate prevailed and was enthroned as Alexander II.

The reform movement, meanwhile, continued to gain ground under Hildebrand, who, made arch-deacon in 1059, was now created papal chancellor. At last on the death of Alexander, Hildebrand, who had guided the policy of his six predecessors, was chosen by popular acclamation, subsequently was canonically elected, and ascended the papal throne as Gregory VII. In accordance with some vague reference to the emperor's voice in papal elections, embodied in the decree of Nicholas II, he deferred consecration until notice of his election had received imperial acknowledgment; no such sanction was ever sought again.

Gregory's first care was thus to secure peace with secular authority in order to further the aims which he put forward at his first Lenten Synod held in Rome, March, 1074. The reforms there promulgated, the abolition of simony, and the moral discipline of the clergy set forth in decrees involving clerical celibacy and continence, were intended as means only to an end, of which the uplifting and purifying of the clergy were necessary conditions.

The uproar created throughout Europe by the promulgation of these decrees did not deter Gregory, who followed them up by sending his legates over the country with authority to depose such of the clergy as should refuse to submit, and he enforced them still further by attacking the real root of the evil, i.e. lay investiture or the appointment to ecclesiastical offices by secular persons, an old abuse against which the reforming body in the Church had protested in vain. The decree of the synod which excommunicated any lay person, emperor or king, who should confer an investiture in connexion with any ecclesiastical office, brought the pope into collision with the whole secular force of Europe, while the interests involved and the personal character of the combatants embittered the struggle.

The emperor, Henry IV, who previously had confessed his misdeeds against the Church and promised amendment, was now summoned to appear before a council at Rome to answer for his conduct.



Gregory VII,  
Pope, 1073-85  
After Raphael

Henry's answer was to summon a meeting of his supporters at a great council held at Worms, January, 1076. Defending the emperor against the charges laid against him, they proceeded to depose the pope himself, this decision being announced to Gregory by letter in which the emperor addresses the pope as "Hildebrand, no longer Apostolic but a false monk."

Gregory responded by excommunicating the emperor at a synod in Lent (1076), deposing him and absolving his subjects from their allegiance. Henry, finding himself gradually abandoned by his partisans and faced with the possibility of the election of another emperor, felt compelled to submit, and hurried to Italy. The story of his three days' humiliation in the snow outside the walls of the castle of Canossa is well known.

Yet the triumph of Hildebrand was more apparent than real; at the price of an outward show of mortification Henry was able to obtain all he desired. He again incurred excommunication in 1080, but the death of one enemy, Rudolf of Swabia, elected by the German princes at the council of Augsburg in 1077 to succeed him, enabled him at last to concentrate all his forces on his greater enemy the pope. Having set up an anti-pope in the person of the excommunicated archbishop of Ravenna, who took the name of Clement III, he marched on Rome, where on March 21, 1084, he caused himself to be crowned by the pseudo-pope. Meanwhile Gregory, obliged to leave Rome, took refuge first at Monte Cassino, the great Benedictine monastery, and then at Salerno, where he died May 25, 1085. One of his last acts was to release from sentence of excommunication all his enemies except Henry and the anti-pope. Gregory VII was canonised by Paul VI in 1606. The extent of his reforms entitles him to be called the greatest medieval pope. Consult Hildebrand and His Times. W. R. W. Stephens, 1898; Life and Times, A. H. Mathew, 1910; Life, A. J. Macdonald, 1932.

**Gregory VIII** (d. 1187). Pope. His name was Alberto di Morra, and he became a monk. In 1155 he was made a cardinal, and in 1172 papal chancellor. In the same year he was one of the two legates sent to England by the pope to inquire into the circumstances attending the murder of Becket, and from him Henry II received absolution. As pope Oct.-Dec., 1187, he tried to effect a reconciliation with the emperor Frederick I in order to present a united front against

Saladin. He died at Pisa, Dec. 17, 1187, whither he had gone with the object of making peace between the two rival seaports of Pisa and Genoa, on whom depended the naval and transport operations of the projected crusade.

**Gregory IX** (c. 1145-1241). Pope 1227-41. Born at Anagni in the Campagna district, his name



Gregory IX.  
Pope, 1227-41

was Ugolino, Conte de Segni. Under his relative, Pope Innocent III (1198-1216), he was made a cardinal 1206, and in 1207-9 was legate on important diplomatic missions to Germany. By Pope Honorius III he was created plenipotentiary legate for Lombardy and was deputed to preach a new crusade to the Holy Land. Ugolino ascended the papal throne March 19, 1227, on the death of Honorius, and three days later summoned the emperor Frederick II, who had taken the cross on his coronation in 1220, to the fulfilment of his vow. This was the beginning of a struggle between the papacy and the empire, which lasted the whole of Gregory's pontificate, and only ended with the death of Frederick in 1250.

The emperor apparently complied with the summons, sailed from Brindisi in Sept., and returned in three days. The pope, distrusting his sincerity, launched on him sentence of excommunication, Sept. 27, 1227, but he could not prevail on the princes and bishops of Germany generally to acquiesce in the sentence which released them from their oath of allegiance to Frederick, and the publication of the ban in S. Peter's, Rome, so excited the Ghibellines that the pope fled from the city to avoid the violence of the mob.

The emperor, disregarding the sentence, continued his crusade, and wrote from Jerusalem, March 17, 1229, to announce the success of the expedition; the Holy City was once more in Christian hands, and Frederick crowned himself in the church of the Holy Sepulchre. His triumph seemed complete, but his position was intolerable. He abruptly left Syria and returned to Europe to find his opponent a fugitive at Perugia.

Gregory returned to Rome in Feb., 1230, and a peace between the two belligerents was concluded in July. But athwart the Hohenstaufen dream of universal domination lay the papacy, represented

by a figure as indomitable as Frederick himself, and trouble soon broke out. For a time the struggle was maintained by the Lombard League, which Gregory joined on the avowal of the emperor's intention to extend his empire over almost the whole of Italy, including the papal states. On March 20, 1239, Gregory again excommunicated Frederick, and later gave orders for a general council to assemble at Rome at Easter, 1241. But Frederick, who had defeated the league at Cortenuova, 1237, continued his progress in spite of a reverse before Brescia the following year, and effectually prevented the meeting by threats and violence. Advancing with his army, he was already within sight of Rome when news arrived that his opponent had died on Aug. 22, 1241.

In contrast with this struggle is Gregory's attitude towards the Mendicant Orders, whose rise is the prominent religious feature of the period. He was appointed Protector of the Friars Minor in 1220 at the special request of S. Francis, whom he canonised in 1228; and he was the friend and patron of S. Dominic. The pope sought in the Friars, as well as in the older orders, instruments for the conversion of the heathen in the remoter parts of Europe, in Asia, and in Africa. He made unsuccessful attempts to induce the Eastern Church to return to the unity of Christendom.

Gregory's special legislation, which withdrew heresy cases from secular jurisdiction and brought them before special tribunals on which members of the new religious Orders, and more particularly Dominicans, were appointed to sit, dates the medieval Inquisition as a creation of his pontificate.

**Gregory X** (1210-76). Pope 1271-76. Born at Piacenza, his name was Teobaldo di Visconti. He was elected pope Sept. 1, 1271, after a vacancy of nearly three years in the Holy See following the death of Clement IV. Gregory was not a cardinal, nor even a priest, when the choice of the cardinals at Viterbo fell upon him, and he was engaged at the time in an expedition to the Holy Land. Ordained priest six days after his entry into Rome, March 13, he was consecrated pope, March 27, 1272. Gregory's aims were peace for Europe, the reform of the Church, and the reunion of Christendom by the abolition of the Eastern Schism. In the cause of peace he endeavoured to reconcile the warring factions of Guelph and Ghibelline; he persuaded the German electors to choose a new emperor on the death (1272) of Richard of

Cornwall, and loyally supported their choice against rival claimants. In the interests of reform he summoned a General Council which met at Lyons, May, 1274, where he promulgated the new law of the Church for papal elections.

But the passion of Gregory's life was for the Holy Land and the kingdom of Jerusalem then tottering to its fall. His death (Jan. 10, 1276) put an end to his preparations for a fresh crusade and dissolved the new reunion of East and West. He received local veneration as a saint in Italy, where his feast is kept on Feb. 16.

**Gregory XI** (1331-78). Pope 1370-78. His name was Pierre Roger de Beaufort, and he was



Gregory XI,  
Pope, 1370-78

created a cardinal at the age of eighteen by his uncle, Clement VI. On Dec. 30, 1370, he was elected pope. The seventh in succession of the Avignon popes, the most memorable act of his pontificate was the re-transference of the see to Italy. Beginning with plans for reform and reconciliation, he was forced to concentrate his efforts on quelling the rebellion of his own subjects. When Gregory laid Florence under a ban, the citizens sent S. Catherine of Siena to Avignon to intercede for them (June, 1376). She failed in her embassy, but induced the pope to return to Rome. Contrary to the advice of his court Gregory sailed for Italy, and made his formal entry into Rome, Jan. 17, 1377, thus ending the 70 years' exile. He died March 27, 1378.

**Gregory XII** (c. 1327-1417). Pope 1406-15. Angelo Corraro, or Correr, who as Gregory XII was

recognized as rightful pope during the Great Schism (1378-1417), was born at Venice of a noble family, became bishop of Castello in 1380, and in 1405 cardinal.

He was elected to the papacy in succession to Innocent VII in 1406. Before the election each cardinal vowed that in the event of his own election he would abdicate his right provided that the anti-pope Benedict XIII would do the same.

The proposal to do this immediately after the election fell through, and subsequently the pope pro-

ceeded to make cardinals of the members of his own family, contrary to his promise to the conclave. The Council of Constance (1414-18) declared the deposition of all anti-popes and received Gregory's abdication, conferring on him the bishopric of Porta, which he held up to his death, Oct. 18, 1417.

**Gregory XIII** (1502-85). Pope 1572-85. Ugo Buoncompagno was born Jan. 7, 1502, at Bologna, at



Gregory XIII,  
Pope, 1572-85

the university of which he studied and taught. Coming to Rome in 1539, he was employed successively by Paul III, Julius III, Paul IV, and Pius IV. He was sent by Pius IV, in 1559, in a confidential capacity to the Council of Trent, where he remained until it closed in 1563, and the following year was made cardinal. He was elected pope on the death of Pius V.

Faced with the loss to the Church of whole nations through Protestantism, Gregory sought a remedy in the building and endowing of colleges and seminaries for the training of propagandists and candidates for the ministry. Among the foundations built or endowed by him was the Jesuit College, Rome, an Order on which Gregory relied for missionary work in China, Japan, and India. An order was given by him for a Te Deum to be sung in Rome in celebration of S. Bartholomew's Day.

The most memorable act of his pontificate was his reform of the Julian calendar (*see* Calendar). Gregory's method of replenishing his treasury, depleted by his building schemes, by confiscating old properties the titles to which he claimed as lapsed, involved him in much trouble with his subjects. He died April 10, 1585.

**Gregory XIV** (1535-91). Pope 1590-91. The son of a Milanese senator, Niccolò Sfondrati, he was born Feb. 11, 1535, and educated at the universities of Perugia and Padua. In 1560 he was made bishop of Cremona, and cardinal in 1583. Elected pope in succession to Urban VII, by the advice of Philip II of Spain he joined the league against Henry IV of France. He died Oct. 15, 1591.

**Gregory XV** (1554-1623). Pope 1621-23. Alessandro Ludovisi was born at Bologna, studied at Rome under the Jesuits, and graduated at the university of his native city. Returning to Rome, he was ap-

pointed to various offices by successive popes, was made archbishop of Bologna in 1612 and



Gregory XV,  
Pope, 1621-23

cardinal in 1616 by Paul V, whom he succeeded as pope in 1621. His pontificate was responsible for two decrees of importance, the first establishing a regular mode and ritual in the conduct of papal elections, the second constituting a special and permanent congregation for the control of foreign missions. He died at Rome, July 8, 1623.

**Gregory XVI** (1765-1846). Pope 1831-46. Mauro, or Bartolomeo Alberto Cappellari, born at



Gregory XVI,  
Pope, 1831-46

Belluno in Venetia, Sept. 8, 1765, entered a Camaldolese monastery and became a priest. Sent to Rome, in 1800 he was made abbot of San Gregorio on the Coelian Hill. Forced during the Napoleonic troubles to retire from Rome, he returned thither on the fall of the emperor. In 1825 he was created cardinal.

His election to the papacy, Feb. 2, 1831, in succession to Pius VIII was the signal for an outbreak of revolution in the papal states which was only kept in check with the assistance of armed force from Austria. Gregory was wholly opposed to any measure of democratic control, and the Encyclical of 1832, rejecting the appeal of Lamennais, Lacordaire, and Montalembert, showed him equally unsympathetic to political liberalism. He died June 9, 1846.

**Gregory, Lady** (1859-1932). British dramatist. She was Augusta, youngest daughter of Dudley Perse of co. Galway, and married in 1881 Sir William Gregory (d.1892). Lady Gregory was an enthusiastic promoter of the Irish literary revival. Two remarkable works, *Cuchulain of Muirtemne*, 1902, and *Gods and Fighting Men*, 1904, render Irish



Lady Gregory,  
British dramatist  
Beresford



sagas into the idiom of the Irish peasantry, into which she also translated three of Molière's plays, *The Kiltartan Molière*, 1910. Her own plays, produced by the Irish Literary Theatre, which with Yeats she helped to found, include *Spreading the News*, *The White Cockade*, *The Rising of the Moon*, *The Workhouse Ward*, *The Gaol Gate*, and *The Full Moon*. Lady Gregory died May 22, 1932. *Consult* Journals, ed. L. Robinson, 1946.

**Gregory, Sir Richard Arman** (1864-1952). A British scientist. The son of a cobbler of Socialist sympathies, he was born at Bristol, Jan. 29, 1864, and started work as errand boy at 12. At 19 he became a laboratory assistant at Clifton College where he was allowed to attend lectures and in 1885 won a scholarship which took him to the Royal College of Science, S. Kensington; there he formed an enduring friendship with H. G. Wells. Work with the solar physics committee brought him to the notice of (Sir) Norman Lockyer who in 1893 made him assistant editor of *Nature*. Gregory's editorship of that periodical 1919-39 brought it world-wide standing. Made F.R.S. 1933, he was president of the British Association 1939-46. He was knighted 1919, made a baronet 1931. He died Sept. 15, 1952, without an heir. *Consult* Life, W. H. G. Armorytage, 1957.

**Gregory's Powder.** Old-fashioned purgative made of rhubarb, magnesium carbonates, and ginger.

**Greiffenhagen, Maurice William** (1862-1931). British artist. Born in London, Dec. 15, 1862, of a Russian father and an English mother, he studied at the R.A. schools, and long successfully practised black and white work, illustrating e.g. many of Rider Haggard's tales. In 1906 he was appointed head of the "life" dept. of the Glasgow School of Arts, and in 1916 was elected A.R.A., and R.A. in 1922. He is represented in the Chantry bequest. He died Dec. 27, 1931.

**Greifswald.** One of the oldest and, in the later Middle Ages, most important towns and ports of Pomerania, Germany. It stands 2 m. from the mouth of the Ryckgraben, 20 m. S.E. of Stralsund. Founded 1241, endowed with urban rights 1250, it was a member of the Hanseatic League from 1278. Its university, founded 1456, specialising in Nordic and Finnish studies, was the oldest of Prussia's universities when the district was annexed in 1815. From 1648 to 1807 Greifswald

was the seat of the Swedish government of Pomerania; during 1807-10 under French rule. In 1945 it fell to the Russians. It has a spa for rheumatic diseases. The church of S. Mary is typical of northern brick Gothic (13th century), and that of S. Nicholas has a 330-ft. tower (14th century). Pop. 29,722.

**Greisen.** Rock consisting of quartz and mica. It is a variation of the granite in which it occurs, being recrystallised granite in which the feldspar has been replaced by quartz and mica. It is often associated with deposits of tin and tungsten ores.

**Greiser, Arthur** (1897-1946). Danzig politician. Starting as a mason, becoming an oil merchant, and a motor boat owner, he entered the Danzig parliament and became a prominent advocate of Nazism about 1930, acquiring notoriety by thumbing his nose at the League of Nations assembly during a Danzig discussion, 1936. Gauleiter of Poznan (Posen) under Hitler in the Second Great War, he was said to have transferred 50,000 Polish peasant families from their homes in two years, and to have massacred 100 political prisoners on one occasion at Zgerz in 1942. His capture was announced by the Russians, April 4, 1945. Condemned as a war criminal, he was executed at Poznan, July 21, 1946.

**Greiz.** Town of Germany, in Thuringia, formerly the capital of the principality of Reuss-Greiz (or elder branch). It stands on the White Elster, 50 m. S. of Leipzig, the new town being on the left bank and the old town on the right. Notable features are a 16th century castle built on an eminence overlooking the town, two handsome palaces, formerly the re-

sidences of the prince of Reuss, a university, several churches, and government buildings. Greiz has machine, paper, and chemical plants. Pop. 39,903.

**Gremlins.** Goblins playfully invented by the R.A.F. during the Second Great War. These sprites were blamed for any inexplicable occurrence that might befall an unfortunate air crew. Mysterious petrol stoppages, a jammed gun, the failure of an aircraft to fly level, the erratic behaviour of a compass, were all attributed to the malignant influence of gremlins. There were male, female, and baby gremlins, each having its own sphere of influence.

**Grenada.** Island of the W. Indies, in the Caribbean Sea, belonging to the U.K. It is the southernmost of the Windward group, and lies 86 miles due north of the west end of Trinidad. Area 133 sq. m. Pop. (1954 est.) 85,300. Grenada



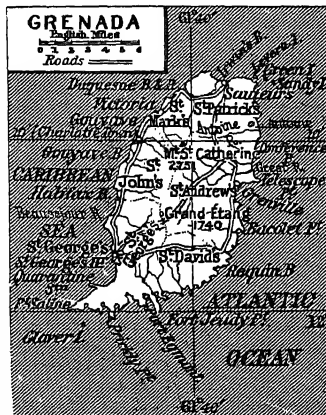
Grenada arms

is among the most beautiful of the islands of the W. Indies, with diversified scenery, a delightful climate, and exceedingly fertile soil suitable for the raising of tropical produce. Of volcanic origin, a wooded range of mountains, reaching an elevation of 2,751 ft. in St. Catherine's Mt., traverses the island from N. to S. It includes several extinct volcanoes, whose craters are now lakes, the chief being the Grand Étang and Lake Antoine. There are numerous small rivers, besides hot mineral springs. One-fourth of the area is cultivated, and agriculture is the principal occupation.

The chief products are cacao, coffee, sugar, rum, nutmegs, mace, cotton, cotton seed, arrowroot, hides, timber, and turtles, most of these being exported. The most prominent industry concerns cacao, and there is a sugar factory. The roads are good, the rainfall abundant, and there is steamer communication with the neighbouring ports and islands.

St. George's, the capital, has a population of about 6,000; it lies on a peninsula on the W. of the island, and has an excellent harbour, nearly landlocked; it is a coaling station. Other towns are Gouyave, Sauteurs, and Grenville. Grenada is administered by a legislative council, with a governor assisted by seven nominated and seven elected members.

Discovered by Columbus on Aug. 15, 1498, it was settled by

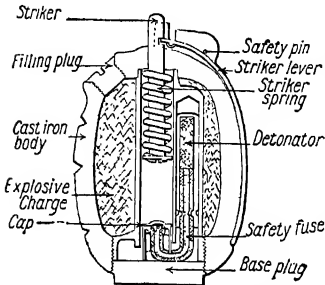


Grenada. Map of this West Indian island in the Caribbean Sea

the French—the natives still speak a French *patois*. Captured by the English in 1762, it was retaken by the French in 1779, and finally restored to Great Britain in 1783. In 1795 the French landed troops on the island, causing an insurrection, which was not quelled until the following year.

**Grenade.** Small missile containing an explosive charge, sometimes referred to as a bomb. A primitive form of grenade was used during the 15th century. It was filled with gunpowder and had a wooden, earthenware, or metal casing, the fuses being crude and uncertain. Hand missiles were employed after 1660 by special troops called grenadiers (*q.v.*), and were in common use during the 17th–18th centuries. Having fallen into disuse, they were revived in a high explosive form in the Russo-Japanese War of 1904, and in the trench fighting of the First Great War.

The principal anti-personnel grenade of the British army is the Mills or No. 36 grenade, invented



Grenade. Sectional diagram showing principal parts and explosive mechanism of a Mills grenade

during the First Great War. It consists of a barrel-shaped metal casing, externally grooved in segments to ensure good fragmentation. It weighs  $1\frac{1}{2}$  lb. and contains  $2\frac{1}{2}$  to 3 oz. of high explosive. The safety fuse is ignited mechanically as soon as the grenade is thrown; this happens on the release of a striker actuated by a spring, which until then has been retained by a lever. On withdrawing the safety pin, the lever is held to the grenade by the thrower's fingers, but on the grenade being released, the loose lever is freed and a cap is struck which ignites the length of safety fuse. Originally there were two lengths of fuse, one burning four and the other seven secs.; but after accidents, the four-sec. fuse was standardised.

Rifle grenades are used to increase the range, and were originally of the percussion type, with

a steel tail rod, inserted into the barrel of the ordinary service rifle and propelled by the gases of a blank cartridge. This tended to damage the rifle and led to the introduction of the discharger cup. A short cylindrical cup is attached to the muzzle of the rifle, the grenade is placed in it and discharged by the gases from a blank cartridge acting on the base of the grenade. Range is governed by elevation of the rifle, and by a gas-check with adjustable gasports. The Mills grenade can be adapted for firing from a discharger cup by the addition of a gas-check plate.

The anti-tank grenade No. 73 has a percussion fuse, and a tinned plate casing containing about  $3\frac{1}{2}$  lb. of high explosive. The fuse has a safety device consisting of a pin attached to a tape; the tape unwinds with the rotation of the grenade during flight, and so withdraws the safety pin. Until the grenade is ready for throwing, the tape is prevented from unwinding by a safety cap. The phosphorus or A.W. grenade, used against tanks, vehicles, pillboxes, etc., ignites spontaneously as soon as the glass casing is broken. The sticky or S.T. grenade is a high explosive projectile with a five-sec. time fuse, designed to stick on impact and used against armoured fighting vehicles. It consists of a glass flask in a sticky woollen cover, and contains  $1\frac{1}{2}$  lb. of high explosive. A throwing handle incorporates a device for igniting the safety fuse. This grenade is effective only against lightly armoured vehicles.

**Grenadier.** Literally, a soldier who throws a grenade. He appeared first in the 17th century, the early custom being for each regiment to have its company of grenadiers. The French led the way, their example being soon followed in England and elsewhere; in England soon after the formation of the standing army each battalion had its grenadier company. The grenadiers were picked men, and this company was usually regarded as the leading one in a regiment, taking the place of honour on parade.

The next step was to form these companies into battalions. This was done in France and Prussia more than in England, and hence arose the regiments that now bear the name grenadiers. Grenadier companies ceased to exist in the British regiments soon after 1850. The grenadier's special head-dress was a pointed

cap of embroidered cloth, having peaks and flaps; or a loose fur cap similar in shape.

**Grenadier Guards, THE.** Regiment of the British army. Raised by Col. Russel in 1660, from men who had served in a King's Royal Regt. of Guards, a Cavalier unit formed in Flanders in 1656, it became the body-guard of Charles II. The premier regiment of



Grenadier Guards badge

Foot Guards, the Grenadier Guards won their first battle honour at Tangier in 1680; their second at Namur in 1695; and Gibraltar was added in 1704–05. Then followed Marlborough's four great victories. They fought at Dettingen and Fontenoy; and two battalions were with Moore at Corunna. During the Peninsular campaign the regiment gained also the honour of Nive. Two battalions lost more than 1,000 men at Quatre Bras and Waterloo, receiving the title of the First or Grenadier Regt. of Foot Guards. Later honours were won in the Crimea, Egypt, and South Africa.

In the First Great War the history of the regiment after Sept., 1915, was that of the Guards division; and the honours include most of the principal battles fought in France and Belgium. During the Second Great War three battalions went to France in Sept., 1939, and in 1942 four battalions were included in the newly-formed Guards armoured division, with which they were associated until June, 1945. Grenadier guards fought with the 1st and 8th armies in N. Africa, and with the latter in Italy.

With the other Foot Guards the Grenadiers have the privilege of guarding the royal palaces and the Bank of England, and of marching through the City of London with fixed bayonets. On April 21, 1942, Princess Elizabeth was appointed hon. colonel of the regiment.

**Grenadines.** Cluster of small islands and islets in the Caribbean Sea, belonging to Great Britain. They lie between St. Vincent and Grenada in the W. Indies, and are apportioned administratively between St. Vincent and Grenada. Carriacou, the largest, is attached to Grenada, covers 11 sq. m., and contains most of the pop., having 7,104. Only three of the islands are inhabited, but the soil is fertile.

**Grenfell, BERNARD PYNE** (1869-1926). British archaeologist. Born at Birmingham, Dec. 16, 1869, and educated at Clifton and Queen's College, Oxford, he began exploration work in Egypt in 1894. In company with A. S. Hunt he discovered at Behnesa in 1896-97 and 1905-06 immense hoards of Oxyrhynchus papyri. He was appointed professor of papyrology at Oxford in 1908, and honorary professor in 1916. Grenfell and Hunt published jointly papyri from Oxyrhynchus, Tebtunis, Hibeh, and other finds. The Sayings of Our Lord, 1897; and New Sayings of Jesus, 1904, were issued separately. Grenfell died May 17, 1926.

**Grenfell, DAVID RHYS** (b. 1881). British politician. He was born at Penrheol, near Swansea, June 27, 1881, and worked as a miner from the age of 12 until he was 35. He qualified as a colliery manager and was appointed miners' agent in 1916. In 1922 he entered parliament as Labour member for Gower. He was a member of the forestry commission, 1929-42; of the royal commission on safety in mines, 1939; and secretary for mines, 1940-42. He was made C.B.E. in 1935. P.C. in 1951.

**Grenfell, JULIAN HENRY FRANCIS** (1888-1915). An English poet. Eldest son of Lord Desborough (*q.v.*), he was born March 30, 1888, and educated at Eton and Balliol College, Oxford. He boxed for Oxford and the army. After winning the D.S.O. in the First Great War, he was wounded and died at Boulogne, May 26, 1915. He is chiefly remembered for his poems Into Battle, and To a Black Greyhound.

**Grenfell, SIR WILFRED THOMASON** (1865-1940). British medical missionary. Born near



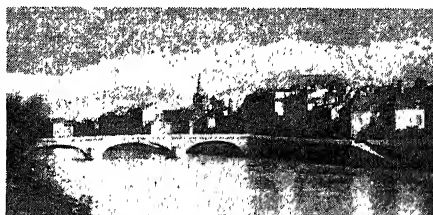
Sir Wilfred Grenfell,  
British medical  
missionary  
Elliot & Fry

Chester, Feb. 28, 1865, he studied medicine, became house surgeon at the London Hospital under Treves, and fitted out the first hospital ship for North Sea fishermen, establishing homes for their use. In 1892 he visited Labrador, living in the trading ports of the Hudson's Bay Company, where he treated some 900 patients. Here he set himself the task of introducing education, health, and social services. His

schemes for the development of the country were supported by lecture tours in Great Britain, Canada, and the U.S.A., until, greatly with American help, the International Grenfell association was founded with an endowment of over £200,000. A chain of hospitals at 150-mile intervals was built throughout Labrador, with nursing stations, orphanages, public schools, welfare clinics, and fishermen's institutes. "Grenfell of Labrador" was knighted in 1927. His publications, mainly autobiographical, included A Labrador Doctor, 1918; Forty Years for Labrador, 1932. He died in Vermont, Oct. 10, 1940.

**Gren Foundation.** Foundation for promoting closer co-operation between the Scandinavian countries by scientific research. Established by a Swede, Axel Wenner Gren, in 1937, it provides about £50,000 a year for scientific research in order to strengthen the work of social and economic improvement.

**Grenoble.** City of France, in the dept. of Isère, the old capital of Dauphiné. It stands on the Isère,



Grenoble, France. Pont d'Hôpital over the Isère. Behind the city lie the snow-covered French Alps

75 m. S.E. of Lyons, and is beautifully situated at the foot of Mt. Rachais. The chief buildings are the cathedral of Notre Dame, partly of the 11th century; the church of S. André, with its monument to Bayard; and the old church of S. Laurent. Secular edifices include the palais de justice, the library, with a fine collection of manuscripts, books, and paintings, and the university. Grenoble is a river port, and is noted for its manufacture of gloves.

The city existed under the Franks, and even earlier. It was part of Provence before becoming part of France, and as the chief town of Dauphiné was an important place, retaining certain privileges until the Revolution. It was occupied by German forces after the Allied landings in N. Africa in Nov., 1942, but became a centre of the French resistance movement. On Nov. 13-14, 1943, an artillery park was destroyed.

and the De Bonne barracks were blown up on Dec. 2, more than 700 Germans being killed or wounded. American troops liberated Grenoble on Aug. 23, 1944. Pop. (1954) 116,440.

**Grenville, WILLIAM WYNDHAM GRENVILLE, BARON** (1759-1834). English statesman. Born Oct. 25,



Lord Grenville,  
British statesman  
After J. Jackson, R.A.

1759, he was the youngest son of George Grenville (*v.i.*). Educated at Eton and Christ Church, Oxford, he entered parliament for Buckingham in 1782. His family connexions made his way easy, and having for a short time been secretary to his brother, Earl Temple, lord-lieutenant of Ireland, he became paymaster-general under Pitt in 1783. In 1786 he was made vice-president of the committee on trade; in 1789, having been for a few months Speaker, he became home secretary, and in 1791 foreign secretary. He had been a peer since 1790.

Grenville remained in office with Pitt until the two resigned in 1801, the period being a most eventful one, but his attachment to Fox prevented him from returning to power in 1804. In 1806, on Pitt's death, he and Fox formed the coalition ministry of "all the talents" but this lasted only until March, 1807, as Grenville, who was premier, refused to pledge himself against relief to Roman Catholics. As an unofficial member he took part in public life, acting mainly with the Whigs, until his death at Dropmore, Jan. 12, 1834, when the peerage became extinct. A fine classical scholar, Grenville also edited Lord Chat-ham's letters to Thomas Pitt.

**Grenville, GEORGE** (1712-70). English statesman. Born Oct. 14, 1712, he was educated at Eton and Christ Church, Oxford, was called to the bar in 1735, but adopted a political career, and from 1740 till his death sat for the borough of Buckingham in the house of commons. He was made a lord of the admiralty in 1744 and of the treasury in 1747; treasurer of the navy, and a privy councillor in 1754, and secretary of state for the northern department, and first

lord of the admiralty in 1762. He was prime minister from 1763 to 1765, the period being chiefly



George Grenville,  
English statesman

notable for the prosecution of John Wilkes, in 1763, and the passing of the American Stamp Act in 1765. He was known as "The Gentle Shepherd," a nickname due to Pitt's quoting the words of the old song, "Gentle shepherd, tell me where," when Grenville was wearying the house with complaints. Grenville died in London, Nov. 13, 1770.

**Grenville** OR GREYNVILLE, SIR RICHARD (c. 1541-91). English sailor. Belonging to an old Cornish family, in his youth he is reported to have fought with distinction in the Austrian service against the Turks in Hungary. He was one of the members for Cornwall in the parliaments of 1571 and 1584, and was sheriff of the county in 1571.



Sir Richard Grenville.  
English sailor

In 1591 Grenville was appointed vice-admiral, or second in command, under Admiral Sir Thomas Howard, of a squadron sent to the Azores to intercept the homeward bound Spanish treasure fleet. Spain had, however, learned of the dispatch of this squadron, and sent a fleet of 53 vessels to the Azores, where they arrived, Aug. 31. Howard's fleet, anchored north of Flores, numbered only 16, and at least half his men were sick with scurvy, so he hurried his men aboard, and put to sea.

For some reason the *Revenge*, Grenville's flagship, was unable to follow, and was cut off. Grenville thereupon determined to pass through the Spanish line; he made a dash, but was becalmed under the lee of the enormous galleons, whose men boarded her, and after a fierce fight captured and overwhelmed the few survivors of her crew. Mortally wounded, Grenville was taken aboard the Spanish admiral's flagship, where he died a few hours later. For fifteen hours 150 men had fought hand to hand against 5,000 Spaniards, and it was not until their number was reduced to 20 that they yielded. The story is finely told in Tennyson's poem, *The Revenge*.

**Gresford.** Colliery village of Denbighshire, Wales, 3 m. N. of Wrexham on the rly. A mine explosion followed by fire caused 264 deaths on Sept. 22, 1934.

**Gresham, SIR THOMAS** (c. 1519-79). English merchant and financier. Born in London, second son of Sir Richard Gresham (d. 1549), lord mayor of London in 1537, and an ancestor of the marquess of Bath, he came of an old Norfolk family. Educated at Gonville Hall, now Gonville and Caius College, Cambridge, and a student at Gray's Inn, he joined the Mercers' Company, and amassed a fortune.

Knighted by Queen Elizabeth, he acquired lands in Norfolk and Suffolk, and had mansions at Mayfield, in Sussex, and Osterley, in Middlesex. He was lamed for life by a fall from his horse in 1560, and lost his only son in 1564, and, deciding to devote his wealth to public ends, carried out, in 1566-68, a project of his father's by founding the Royal Exchange. He died, Nov. 21, 1579, and was buried in St. Helen's Church, Bishopsgate.

He bequeathed one moiety of the Exchange to the city corporation, the other to the Mercers' Company, in trust for the foundation of the Gresham Lectures. He



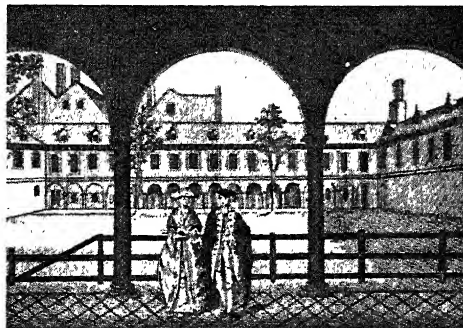
Sir Thomas Gresham, English merchant  
*After Holbein*

left his house in Bishopsgate Street for the use of the lecturers, founded eight almshouses, and left money for other charities. *Consult* Life and Times, J. W. Burgon, 1839; Life, F. R. Salter, 1925.

**Gresham College.** Educational centre in London. It was originated by Sir Thomas Gresham (q.v.), who left his residence in Bishopsgate Street to the corporation of the city of London and the Mercers' Company, for the purpose of starting lectures in various subjects. In 1597 the lectures were organized and begun,



Gresham College  
arms



Gresham College. The courtyard of Sir Thomas Gresham's house in which Gresham College was started

*From an old print*

and they have been continued ever since. There are seven lecturers, and each delivers twelve lectures a year. They are on divinity, astronomy, music, geometry, law, physic, and rhetoric.

**Gresham's Law.** Economic law that may be roughly stated as "bad money drives out good." It was first expressed thus in a document of 1560, dealing with the proposed reforms of the coinage, but its present name was only given by H. D. Macleod, in 1858, in the belief that Sir Thomas Gresham was responsible for the statement made in the above proclamation. The truth of the law is amply proved by experience. Where there are two forms of currency, each being legal tender, persons will naturally pay their debts in the less valuable one, retaining any of the more valuable one they may have, which thus will tend to disappear from circulation. The existence of this law is a strong argument against bimetalism (q.v.).

**Gresset, JEAN BAPTISTE LOUIS** (1709-77). French poet and dramatist. Born at Amiens, Aug. 29, 1709, he is remembered chiefly for one capital comedy, *Le Méchant*, and a burlesque poem, *Vert-Vert*, which contains beneath its humorous story of a convent parrot some shrewd satire on monastic life. He died at Amiens, June 16, 1777.

**Grès Ware.** Variety of stoneware. The finer qualities are made of a mixture of clay, quartz sand, lime or barytes. Cologne grès was celebrated. *Pron.* gray.

**Greta.** River of Cumberland, England. It is a tributary of the Derwent, which it joins near Kes-

A munition-making township sprang up during the First Great War around Greta Green. The whole undertaking cost £9,000,000, and employed at one time 24,700 persons. It was sold in 1924. The worst accident in British railway history occurred on the old

Caledonian line, one mile north of Greta on May 22, 1915, when a troop train ran into a stationary local train. The work of rescue had scarcely begun when the London-Glasgow express crashed into the wreckage. The troop train catching fire, 227 soldiers were killed and 200 injured.



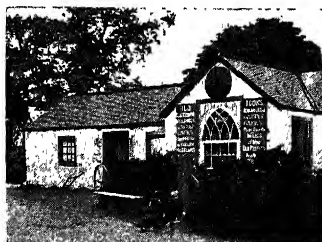
Greta Bridge. From the famous water colour by J. S. Cotman of the bridge over the river Greta in N.W. Yorkshire

Reeve Collection, British Museum

wick. Its length is 4 m. Overlooking it is Greta Hall, where Southey lived from 1803 until his death in 1843, and Coleridge from 1800 to 1809.

There are two rivers of this name in Yorkshire. One is a tributary of the Tees, while the other rises near Ingleton and falls into the Lune. The former is the stream described by Scott in *Rokeby* and in poems, and painted by Cotman and Turner. Greta Bridge is on the main road between Bowes and Catterick.

**Gretna Green.** Village of Dumfriesshire, Scotland. It is 9 m. N.W. of Carlisle, near the little



Gretna Green. The smithy where formerly many runaway couples were married

river Sark that divides England from Scotland. Its situation close to the border was convenient for runaway marriages, because here couples could take advantage of the Scottish marriage laws. The marriages were usually performed by the blacksmith or innkeeper in his smithy or inn. The practice flourished from 1770 until abolished July 1, 1940. On the English side of the Sark is Gretna village.

**Grétry, ANDRÉ ERNEST MODESTE** (1741-1813). Belgian composer. Born at Liège, Feb. 8, 1741, he became a chorister in a church and when quite young produced some symphonies. For seven years he studied in Rome, and afterwards, on the advice of Voltaire, settled in Paris. Grétry devoted himself almost entirely to the composition of comic operas, upon the form of which he exercised considerable influence. The best known are *Richard Coeur de Lion*; *Lucille*; *Zémire et Azor*; *L'Amant Jaloux*; and *L'Epreuve Villageoise*. In France he became the most popular composer of his day. He died Sept. 24, 1813.

**Greuze, JEAN BAPTISTE** (1725-1805). French painter. Born at Tournus, near Mâcon, Aug. 21, 1725, he studied under Charles Grandon (1691-1762) of Lyons. His first exhibited picture, *A Father Expounding the Bible to his Family*, gave promise of a highly successful career, and in 1755 his *Blind Man Duped* secured his election to the Academy. A sojourn in Italy modified his style to some extent, but on returning to Paris he resumed his work in genre. In 1769 he submitted his *Severus Reproaching Caracalla*, a

poor production in what was meant to be the historical mode, and though the Academy now admitted him, he was classed only with painters of genre. He suffered heavy pecuniary losses in the Revolution, and with the Directorate a complete change in the prevailing taste in art took place. He died in poverty in Paris, March 21, 1805.

The works of Greuze which have commanded most attention (and the highest prices) since his death

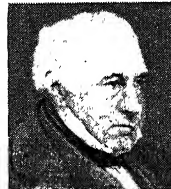


Greuze. *Psyche*, the picture formerly called *Sorrow*, painted in 1788  
Wallace Collection

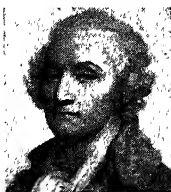
have been mainly tenderly painted, if sentimental, studies of young women. Examples are in the Louvre, Paris, and the National Gallery, London.

**Greville, CHARLES CAVENDISH FULKE** (1794-1865). A British diarist. Born April 2, 1794, he was a great-grandson of the earl of Warwick, and a grandson of the duke of Portland. Educated at Eton and at Christ Church, Oxford, he secured the position of secretary of Jamaica, a non-

resident sinecure. In 1821 he became also clerk of the privy council, and remained until 1859. He kept a diary throughout his official career, which contains valuable material. The first part was published in 1875, a preface being contributed by his friend Harry Reeve. The whole, known as *The Greville Memoirs*, had appeared in seven volumes by 1887. Greville's comments on royal personages are so frank that some



*Greville*



*Greuze*

passages in the first volumes were suppressed. A later edition, 1927, aroused much discussion. He died Jan. 18, 1865. His *Correspondence* with Reeve was edited by A. H. Johnson, 1924.

**Grévy, FRANÇOIS PAUL JULES** (1807-91). President of the French republic, 1879-87. Born at Mont-



F. P. J. Grévy,  
French president

sous-Vaudrey, Jura, Aug. 15, 1807, he was a strong republican while a law student in Paris. After the revolution of 1848 he was elected deputy in the constituent assembly, sitting also in the legislative assembly, 1849-51, when, opposed to the *coup d'état* of Napoleon III, he returned to the bar. Under the third republic, he was president of the national assembly, 1871-73, and of the chamber of deputies, 1876-79.

Grévy succeeded MacMahon as president of the republic, Jan. 30, 1879. Although his signature of peace with China in 1885, made an inconclusive end to French difficulties in Tongking, and in home affairs his record lacked distinction, he was re-elected for seven years in Dec. But his reputation was severely damaged by revelations that his son-in-law (Daniel Wilson) was trafficking in honours and offices, and Grévy resigned Dec. 2, 1887. He died at his birthplace, Sept. 9, 1891.

**Grew, NEHEMIAH** (1641-1712). English botanist. The son of a clergyman, he was born at Atherstone, educated at Cambridge, but took his degree as a doctor of medicine at Leyden. In 1672 he began to practise in London, and soon had a large connexion, but his best work was done as a student of botany. His researches were embodied in his *Anatomy of Vegetables*, begun 1672, and his *Anatomy of Plants*, 1684, and to him and Malpighi are due the foundations of our knowledge of plant anatomy. Grew was secretary of the Royal Society from 1677 until his death, March 25, 1712. A genus of trees, *Grewia*, is named after him.

**Grey, CHARLES GREY, 2ND EARL** (1764-1845). British statesman. Born at Fallodon, Northumberland, March 10, 1764, he was the eldest son of Gen. Charles Grey who became 1st earl in 1806 and died 1807. Educated at Eton and King's College, Cambridge, the

younger Charles in 1786 was M.P. for Northumberland and soon associated himself with Fox and the Whigs. His first experience of office was in the coalition ministry of 1806-07, in which he was first lord of the admiralty and then foreign secretary.



Grey  
After Lawrence

The successor of Fox, Grey did not greatly distinguish himself in opposition during the long period of Tory ascendancy that ended in 1830. However, when the Whigs were returned to power in 1830, his dignified presence, his stately eloquence, his unblemished character, and his parliamentary experience marked him out as the only possible premier. His ministry was responsible for the great Reform Act; Grey conducted the negotiations with the king, and after handing in his resignation secured the promise that forced the measure through the house of lords. He remained in office when the reformed parliament met, but serious differences in the ministry led to his resignation in July, 1834. He died at Howick, July 17, 1845. The correspondence between Grey and William IV over the Reform Bill was edited by the 3rd earl, 1867. *Consult also* Lord Grey of the Reform Bill, G. M. Trevelyan, 1920.

**Grey, HENRY GEORGE GREY, 3RD EARL** (1802-94). A British politician. The eldest son of the 2nd earl, he was born Dec. 28, 1802. Educated at Eton and Trinity College, Cambridge, he entered parliament in 1826, and in 1830 became under-secretary for the colonies in his father's ministry. During 1835-39 he was secretary for war, and during 1846-52 was colonial secretary. Thenceforward out of office, he remained an active figure in public life, and his age did not prevent him from strongly opposing Home Rule for Ireland. He died at Howick, Oct. 9, 1894.

**Grey, ALBERT GEORGE GREY, 4TH EARL** (1851-1917). British administrator. He was born in St. James's Palace, Nov. 28, 1851, the son of Gen. Charles Grey, private secretary to Queen Victoria, and was educated at Harrow and Cambridge. He was M.P. for S. Northumberland, 1880-85, and

Northumberland (Tyneside), 1885-86. A great traveller, he was in S. Africa in 1894 when his uncle died, and he succeeded to the earldom. He became administrator of Rhodesia in 1896, and was a director of the South African Company, 1898-1904. From 1904 to 1911 he was governor-general of Canada. On his return to England, Earl Grey threw himself into public work with zest, two of his chief projects being Dominion House and the Public House Trust. He was also keenly interested in agricultural reform, and worked for an Irish Convention. He died Aug. 29, 1917, being succeeded in the peerage by his son Charles Robert (b. Dec. 15, 1879).

**Grey of Fallodon, EDWARD GREY, VISCOUNT** (1862-1933). British statesman. Born April



Viscount Grey,  
British statesman

25, 1862, he belonged to the family of which Earl Grey was the head. He was educated at Winchester and Balliol College, Oxford, and in 1882 succeeded his grandfather, Sir George Grey, in the family baronetcy and estates, the former dating from 1814. When he first entered the house of commons for Berwick in 1885 he was known as the amateur champion of tennis and a keen angler. Chosen under-secretary for foreign affairs in 1892, in 1895 he joined the Rosebery group of the Liberal opposition. He supported the government over the S. African War, and formed, with Haldane and Asquith, the Liberal Imperialist League in opposition to the "little Englanders."

In 1905 Campbell-Bannerman appointed Grey foreign secretary. His first act in that office, which he was to hold for eleven years, was to support France at the conference of Algieras, 1906. In the Agadir crisis of 1911 he showed well-timed firmness, authorising Lloyd George's famous Mansion House speech. To Grey goes the credit for summoning in 1913 the conference of ambassadors in London, which settled many Balkan questions.

In assessing Grey's achievement history is most concerned with his actions immediately preceding Aug. 4, 1914. He constantly maintained that foreign policy should be a matter of careful steering rather than bold strokes. French



and Russian ambassadors had told him that the only chance of peace was a firm declaration that England would fight, but this chance was not taken. Grey did not care to gamble on public opinion or to risk splitting his party; so his justly famous speech of Aug. 3, 1914, which laid the facts before parliament and proved the justice of England's case, was of no avail in preventing war.

During the war he did much to preserve the solidarity of the Allies and helped to bring Italy to their side in 1915. With Turkey, Greece, and Bulgaria, he failed. In his dealings with the U.S.A. he showed wisdom and tact. In Dec., 1916, he resigned with Asquith.

Already a K.G., he was created viscount in July, 1916, having refused an earldom. He became an active supporter of the League of Nations, and for a time was Liberal leader in the house of lords; but his activities were somewhat hampered by impaired eyesight. He died Sept. 7, 1933, without an heir to the viscountcy; the baronetcy went to a kinsman, Charles George Grey (b. 1880).

Dignified, reserved, a man of scrupulous honour, completely disinterested, yet sadly handicapped by his constitutional dislike of taking decisions, Grey was less a great statesman than a great gentleman and patriot. He published a volume on Fly-Fishing, 1899; his autobiographical *Twenty-Five Years* (1892-1916), 1925; *Falloodon Papers*, 1926; *Charm of Birds*, 1927; *Speeches on Foreign Affairs* (1904-14), 1931. *Consult Life*, G. M. Trevelyan, 1937.

**Grey, Sir George** (1799-1882). British politician.



Grandson of the 1st Earl Grey, he was born at Gibraltar and educated at Oriel College, Oxford. He became a barrister, and in 1832, as a Whig, entered the house of commons for Devonport. From 1847 to

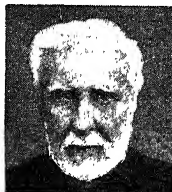
1852 he represented N. Northumberland, and from 1853 to 1874 Morpeth. In 1834 and during 1835-39 Grey was under-secretary for the colonies. When the Liberals came into office in 1846 he was appointed home secretary, leaving office in 1852. After a



Lady Jane Grey, Queen of England  
*From a contemporary portrait*

brief term as colonial secretary he returned to the home office in 1855 and was there until 1858 and again 1861-66. He died at his residence, Falloodon, Sept. 9, 1882.

**Grey, Sir George** (1812-98). British administrator. Born at Lisbon, April 12, 1812, son of an



Sir George Grey,  
British administrator

officer killed at Badajoz, he was educated at Sandhurst. In 1829 he took up a commission in the 83rd Foot, but retired from the army in 1839 with the rank of captain. He took part in 1836 and 1839 in adventurous expeditions along the N.W. coast of W. Australia and along the N. and S. coasts of Shark's Bay. He was governor of S. Australia, 1841-45; of New Zealand, 1845-53, and 1861-67; of Cape Colony, 1853-60; and prime minister of New Zealand, 1877-79. He was made a K.C.B. in 1848, lived in London after 1894, and dying Sept. 20, 1898, was buried in S. Paul's cathedral. He wrote on the dialects of W. and S.W. Australia, his early expeditions, Polynesian mythology, and the traditions and history of the New Zealand race.

**Grey, Lady Jane** (1537-54). Nine days queen of England. Daughter of Henry Grey, duke of Suffolk, great-grand-daughter of Henry VII, and cousin of Edward VI, she was remarkable for her beauty and accomplishments. Under her tutor, John Aylmer, afterwards bishop of London, she acquired great proficiency in Greek, Latin, Italian, French, and Heb-

rew, and her learning aroused the admiration of the great scholars of the day, Roger Ascham professing amazement at her skill in both speaking and writing Greek. In pursuance of a project to alter the royal succession from the Tudor to the Dudley family, she was married, May 21, 1553, to Guildford Dudley, son of the duke of Northumberland, and her accession was announced in Gloucester on July 10, after the death of Edward VI. On July 19 her reign ended, for Mary Tudor was proclaimed in London. Jane was sent to the Tower, and her life would probably have been spared but for participation of her father, duke of Suffolk, in Wyatt's rebellion after which she and her husband were beheaded Feb. 12, 1554, she on Tower Green, he on Tower Hill.

**Grey, Zane** (1875-1939). American novelist. He was born at Zanesville, Ohio, Jan. 31, 1875, and educated at the university of Pennsylvania. Having studied law, he practised in New York, 1898-1904. He won wide popularity by his romances of adventurous life in the American wild. Many were turned into films. *Betty Zane*, 1904, was followed by a rapid succession of volumes, including *The Spirit of the Border*, 1905; *Desert Gold*, 1913; *Wildfire*, 1917; *The Man of the Forest*, 1920; *Forlorn River*, 1927; *Sunset Pass*, 1931. In *Tales of Swordfish and Tuna*, 1927, and similar books, he described fishing experiences. He died Oct. 23, 1939.

**Greyfriars.** Two parishes, Old and New Greyfriars, Edinburgh, Scotland. The name derives from a Franciscan monastery of Observantines founded 1436 by James I, and destroyed in 1547 by the English. The old church, built 1614, and restored after a fire in 1845, had a spire, destroyed 1721; the new church was added in 1721, and its organ was the first introduced into a Scottish Presbyterian place of worship. On the gravestone of Boswell of Auchinleck



Greyfriars, Edinburgh. The historic churches, seen from the S.E.



Greyfriars, Edinburgh. Martyrs' Memorial in the churchyard, commemorating 1,200 Covenanters

was signed the National Covenant, Feb. 28, 1638. During June–Nov., 1679, 1,200 Covenanters, taken prisoner at Bothwell Brig, were interned here. In 1707, in a corner of the churchyard, was erected the Martyrs' Memorial.

The churchyard contains many memorials of a time when, in Stevenson's words, every mason was a pedestrian Holbein.

**Greyfriars School.** See Bunter, Billy.

**Greyhen.** See Blackcock.

**Greyhound.** Ancient breed of dog which hunts by sight. Greyhounds were common in ancient Egypt, and have been known in England at least since the days of Canute. They are used for coursing, and in greyhound racing, a popular amusement in which the dogs chase a stuffed hare propelled by electricity round a closed track.

The greyhound is built for speed, with long graceful lines and great stamina; it has a long arched neck, deep ribs, arched loin, and powerful hind-quarters. The coat is fine and close, black, red, fawn, fallow, brindle, any of these colours with white, white.

Ideal height for dogs is 28 to 30 ins., for bitches 27 to 28 ins.

**Greyhound Racing.** Chasing of a mechanical

hare by greyhounds in an enclosed track. The sport originated in America where, in 1917, O. P. Smith, of Chicago, introduced his mechanical hare on a course at Tulsa, Oklahoma. Charles Munn acquired exclusive rights to the electric hare and built a track at Manchester in 1926. In 1927 another was opened at the White City, London. Now greyhound racing is carried on in many large centres throughout Great Britain, as well as in other countries. More than 2,000,000 attend British meetings each month, nearly half of them at London's 15 tracks.

The mechanical hare is carried on a rail round the track, controlled electrically, and is set in motion just before a lever raises the front of the traps containing the dogs. The dogs never catch the hare, whose speed is regulated by mechanical control, but in their efforts to overtake it give wonderful exhibitions of speed. Quare Times created two



Greyhound. Thoroughbred example of this breed of sporting dog

world records in 1946, running 525 yds. in 28.95 secs. and 550 yds. in 30.38 secs.; the former was broken in 1948 by Prieceless Border with 28.64 secs.

Totalisators have been installed at the principal British tracks,

the turnover for 1949 being £77,000,000. Under the Betting and Lotteries Act, 1934, betting cannot take place by bookmakers or totalisator unless the track is licensed by the local authority. There may not be betting on more than 8 races in a day, which must be carried out within four hours. On four special days in the year betting may be on 16 races and extend for 8 hours. In May each year the licensing authority fixes for all tracks in its area 104 days in the year beginning July 1 on which betting is allowed. The operator of the totalisator deducts 16 p.c. of the stake money (10 p.c. govt. tax, and 6 p.c. for himself), and distributes the rest.

Neither the occupier of a track, nor his servant, agent, or anyone having any interest in any part of the track, may act as a bookmaker on that track.

**Greymouth.** Borough of Grey co., South Island, New Zealand. It is on the larger W. Coast rly., and has rly. connexion with Christchurch. At the mouth of the Grey river, it has a good harbour, carries on gold mining, brickmaking, and sawmilling, and is in the chief coal mining area in the country. Pop. (1951) 8,862.

**Grey Powder** (*Hydrargyrum cum Creta*). Drug compounded of 1 part of mercury with 2 parts of prepared chalk. Dose, 1–5 grains. It is a valuable purgative and intestinal disinfectant for children, especially when there is sluggish liver function.

**Greytown** OR SAN JUAN DEL NORTE. Port of Nicaragua, on the extreme S.E. of the Caribbean Sea. It is closed to foreign trade. Motor boats ply between here and Granada, via the San Juan river and Lake Nicaragua. Pop. 1,000.



Greyhound Racing. The dogs emerging from the traps at a London stadium. Right, a race in progress

Left photo, Greyhound Racing Association

**Greywacke** (Ger. *grauwacke*). Hard, gritty, grey-brown, yellow, or dark coloured rocks of the older formations. Remarkable for the great variety of its constituents, quartz, feldspars, etc., it is common in the S. of Scotland, N. Ireland, and Wales.

**Greywether.** Blocks of sandstone found thickly strewn over the surface of the country in Dorset, Wiltshire, Surrey, N. France, etc. It is so called from its fancied resemblance to sheep.

**Griboiedov**, ALEXANDER SERGEEVICH (1795-1829). Russian dramatist. Born at Moscow, Jan. 4, 1795, he entered the army, but forsook that career for the civil service. While a diplomatic secretary at Tiflis, he began the work by which he is remembered, *The Mischief of Being Clever*. This comedy was so biting a satire on Russian society of the day that it was rejected by the censorship—although a great success in private circulation among the younger generation—and was not publicly performed until 1831. Griboiedov was arrested as a notorious liberal in 1825, but was cleared of the charge. He negotiated the treaty at the end of the 1828 campaign against Persia, but was killed in an attack on the Russian embassy at Teheran, Feb. 11, 1829.

**Grid.** Lines on military maps (also on contemporary Ordnance Survey maps of Great Britain), used for giving map references. Grid lines divide a map into a series of squares, and each line is numbered. The heavy grids enclose an area representing 100 km. by 100 km., which is subdivided by lighter grids into squares 10 km. each way. By dividing the smaller squares into tenths and numbering the tenths along the horizontal and then along the vertical, with the coordinates numbered from 0 to 9, starting at the bottom left-hand corner of the square, it is possible to give six-figure map references.

**Grid.** Network of electrical transmission lines, with associated transformer and switching stations, interconnecting power stations over a wide area of Great Britain. Its function is to convey electrical energy to the required point from wherever it can be most economically generated.

The electricity supply industry as it existed before nationalisation (1947) was economically and financially a complex structure. The public was supplied, in districts, by "authorised under-

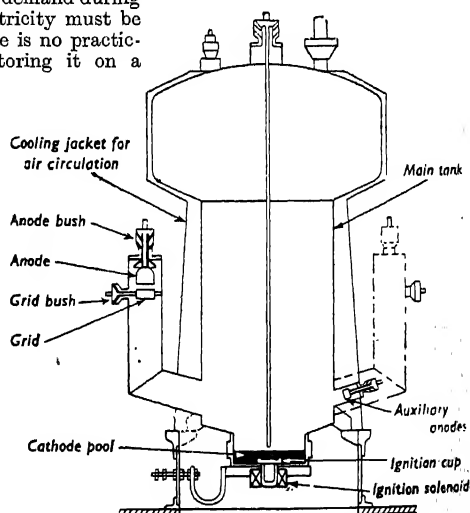
takers." These might own and operate a complete system—generating stations, sub-stations, distribution networks—or they might act as retailers only, owning and operating the sub-stations and distribution networks necessary for supplying the public, but not actually generating electricity, which they purchased as a bulk supply from other sources. There were also power companies who specialised in generation; they could be regarded as wholesalers only. Other concerns might operate as both wholesalers and retailers, supplying the public and, at the same time, giving bulk supplies to other concerns.

The Central Electricity Board which operated the grid was not primarily a wholesaler, nor was it a retailer. It could conveniently be regarded as a kind of exchange or transport system for the wholesalers, which distributed the load amongst them to allow them to operate with maximum economy as a whole. It did not supply the public direct, and it actually owned a trifling amount of the country's generating plant. It confined itself to operating interconnected stations, which in 1946 numbered 142 "selected" and 51 "non-selected." The C.E.B. thus was responsible for the production of over 99 p.c. of the electricity produced by authorised undertakers (N. Scotland excluded).

The advantages conferred by the grid may be seen by consideration of an exaggerated example of a station in an area where there is little demand during the night. As electricity must be available, and there is no practicable method of storing it on a large scale, the alternators must run all night on a light load, consuming steam and coal to no purpose. With grid interconnection such a station could shut down completely for a great part of the night. This interconnection reduces the amount of spare generating machinery held against emergency demands; as well as lessening the chance of failure of supply due to a breakdown.

The Central Electricity Board was subject to some measure of control, both by the government and by the Electricity Commissioners (*q.v.*), its primary concern being (to quote the Electricity Supply Acts of 1926 and 1935) "to ensure that the production of electricity for the public requirements shall be effected at the lowest possible total cost." It was not run as a profit-making concern, its rates of purchasing and selling electricity being so adjusted that its expenditure of income was covered (with interest on borrowed money and sinking fund charges) with a margin of profit approved by the commissioners. From 1927 it expended some £66,000,000, including about £17,000,000 on the standardisation of the frequency of A.C. supplies. The savings to the country in coal, generating plant, and costs much outweighed this sum. Both the C.E.B. and Electricity Commissioners were abolished in 1948 by the nationalisation act of 1947.

**Grid Rectifier.** An electrical apparatus. When power engineers realized that the mercury arc rectifier was practically a mercury-vapour-filled diode valve on a large scale, radio practice was copied by converting it into a triode by the addition of a grid. Since most power rectifiers are polyphase—having 3, 6, 12 or more anodes to the one "pool" cathode—the change consists of inserting a grid in each anode arm just below the anode itself by means of a small insulating bush;



**Grid Rectifier.** Diagram showing arrangement of a typical air-cooled grid rectifier

the grid being a perforated graphite plate or an arrangement of parallel metal strips. The general arrangement is illustrated in the opposite page.

The grid enables the rectifier to be used—(1) as a rectifier with the addition of voltage control by grid regulation; (2) as a high-current self-acting switch or contactor, with as many elements or "ways" as there are anodes; when used in a D.C. circuit, energising one of the grids causes a current to flow, instantaneously reaching its full maximum value, and persisting until the main circuit is broken elsewhere; when used on an A.C. circuit, the current can be started at any desired point in the cycle, but is extinguished at the next zero point—this is the basis of grid voltage control of circuits, since it enables the area of each half-cycle to be readily varied, and hence the R.M.S. value of the voltage to be changed at will; (3) as an inverter, converting D.C. into A.C. at any frequency applied to the grid. This pilot frequency may be derived from a special oscillating circuit, or from the output of another A.C. source with which it is running in parallel.

**Grid System.** Rectangular lay-out of a city or town in which most streets are straight and intersect at right angles. See maps of Melbourne; New York; Washington, etc; also Town Planning.

**Grieg, EDVARD HAGERUP** (1843–1907). Norwegian composer. Born of Scottish origin at Bergen, June 15, 1843, he studied at Leipzig, 1858–62, and at Copenhagen under Gade. On his return to Norway he became intimate with Nordraak and, until that composer's death in 1866, worked at his project of founding a Norwegian school of music. Having started a musical union at Christiania (Oslo), he conducted its concerts 1867–80, and in 1879 played at Leipzig his piano concerto in A minor, which established his reputation. Grieg made the first of three visits to London in 1888; apart from travels abroad, he lived a retired life near Bergen, where he died Sept. 4, 1907.

One of the most popular lyrical composers, Grieg adapted the

classical structure to themes closely allied to traditional tunes. Famous works by "the little master" include the incidental music to Ibsen's *Peer Gynt*; the piano concerto; the *Holberg suite*; and elegiac pieces. At his best in small, lyrical compositions, he wrote many songs, strongly coloured by his individual harmonic contrasts, e.g. *Im Kahne*. *Die Alte Mutter*, *Ich Liebe Dich*. Many were made famous by his wife Nina (1845–1935).

**Grieg, NORDAHL** (1902–43). A Norwegian poet. A native of Bergen and nephew of Edvard Grieg, he was born Nov. 1, 1902; attended Oslo university; at 19 sailed to Australia before the mast, and became an active Communist. A scholarship took him to Wadham College, Oxford, 1923–24, and in 1927 he went as war correspondent to China, later reporting the Spanish civil war. His first poems appeared in 1921, and a novel, *The Ship Sails On*, three years later. His plays include *Barabbas*, 1927; *The Atlantic Ocean*, 1932; *Our Power and Glory*, 1935. His book, *The Young Dead*, includes translations of Keats, Shelley, and Brooke. After the fall of Norway, Grieg joined the air force in England, and was lost in a raid over Berlin on Dec. 2–3, 1943. His war poems were translated into English by G. M. Gathorne-Hardy under the title *All That is Mine, Demand*.

**Grierson, SIR GEORGE ABRAHAM** (1851–1941). British scholar. Born Jan. 7, 1851, at Glenageary, co. Dublin, he was educated at Shrewsbury and Trinity College, Dublin, and was in the Indian civil service, 1873–1903. Eminent as an Oriental scholar, specialising in Indian languages and dialects, he mastered 179 and 544 respectively. His *Linguistic Survey of India*, comprising 18 vols., was published irregularly, owing to the First Great War; one of the greatest feats of modern scholarship, it was responsible for drastic changes in the teaching of Indian universities. Grierson, who was knighted in 1912 and received the O.M. in 1928, died at Camberley, March 7, 1941.

**Grierson, SIR HERBERT JOHN CLIFFORD** (b. 1866). A Scottish literary historian. He was educated at King's College, Aberdeen, and Christ Church, Oxford, becoming professor at Aberdeen in 1894. An authority on the 17th century poets, he was professor of rhetoric and English literature at

Edinburgh, 1915–35, and rector of the university, 1936–39. Grierson was knighted in 1936. His published works include *The First Half of the 17th Century*, 1906; *Lyrical Poetry from Blake to Hardy*, 1928; *Carlyle and Hitler*, 1933; *The English Bible*, 1944; *Critical History of English Poetry* (with J. C. Smith), 1945. He edited the poems of Donne, and was part-editor of the *Oxford Book of 17th Century Verse*, 1934.

**Grierson, JOHN** (b. 1898). A Scottish film director. Born at Deanston, Perthshire, April 26,



John Grierson.  
Scottish film  
director

1898, he was educated at Glasgow, Durham, and Chicago universities. On joining the Empire Marketing Board, he formed a film unit, evolving the documentary film. He then

formed a G.P.O. film unit. Pictures with which he was associated included *Drifters*, 1929; *Industrial Britain*, 1933; *Song of Ceylon*, 1935; *We Live in Two Worlds*, 1937; *The Brave Don't Weep*, 1952. During the Second Great War he was commissioner of the National Film Board of Canada. He was controller of C.O.I. film activities, 1948–52. He pub. *Grierson on Documentary*, 1946.

**Grierson, SIR ROBERT** (c. 1655–1733). Scottish laird, and persecutor of the Covenanters. He presided at the trial and execution of the Wigtown Martyrs, and after the revolution of 1689 was fined and imprisoned. He died of apoplexy. He used the thumbkins in enforcing the Test Act. He was the original of Sir Robert Redgauntlet in Scott's *Wandering Willie's Tale*.

**Griffenfeld, PEDER SCHUMACHER, COUNT** (1635–99). Danish statesman. He was born in Copenhagen, Sept. 3, 1635. In 1663 he became librarian to Frederick III, and later the king's secretary. During 1673–76 he controlled the country's foreign policy, and aimed at establishing a Scandinavian League. Arrested for treason by his political enemies, he was sentenced to death, but the sentence was commuted to imprisonment for life. A victim of injustice, Griffenfeld died after 22 years in prison, March 12, 1699.

**Griffin** or **GRYPHON** (Gr. *gryps*, Lat. *gryphus*). Mythical monster. part lion. part eagle, supposed to

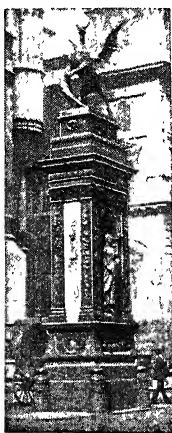


Male Griffin  
in heraldry

typify strength and vigilance. It figures in Persian sculpture as a guardian of treasure, on Greek coins, in classical architecture, and Teutonic legend.

Often confused with the dragon, it is represented in heraldry with the body, tail, and hind legs of a lion, and head, neck, breast, fore legs, and wings of an eagle, and with forwardly pointed ears. When represented rampant it is said to be segreant. The male griffin has no wings, but is armed with protruding rays or tufts of hair, and sometimes horned like the unicorn.

The armorial crest of the city of London is a griffin's sinister wing argent, charged with a cross gules; the supporters are griffins elevated and endorsed, argent and charged on the wings with a cross gules. The Temple Bar Memorial, at the junction of Fleet Street and the Strand, popularly known as The Griffin, erected at a cost of £10,600, and unveiled Sept. 8, 1880, is surmounted by a "griffin."



Griffin on the Temple  
Bar Memorial, London,  
erected 1880

**Griffin, BERNARD WILLIAM** (1899-1956). British cardinal. He was born at Birmingham Feb. 21, 1899, and educated at Cotton College, S. Mary's, Oscott, and the English College at Rome, and was ordained priest in 1924. Secretary to the archbishop of Birmingham, 1927-37, and chancellor of the archdiocese, 1929-38, he became bishop auxiliary of Birmingham in 1939. Named archbishop of Westminster Dec., 1943, he was enthroned Jan. 18, 1944. He was created a cardinal in 1946. During the Second Great War he worked unceasingly for a just and lasting peace; after it he made a number of tours abroad, including a visit to Poland in 1947 and a journey across Canada the same year. He died Aug. 20, 1956.

**Griffin, GERALD** (1803-40). Irish dramatist, novelist, and poet. He was born in Limerick, Dec. 12,

1803, and came to London in 1823. His works include *Tales of the Munster Festivals*, 1827, and *The Collegians*, a novel, 1829, new ed. 1896, on which Dion Boucault founded the play of *The Colleen Bawn*. Griffin formed the teaching society of the Christian Brothers. He died in Cork, June 12, 1840. His *Complete Works*, with a Life, were edited by his brother, William Griffin, 8 vols., 1842-43.

**Griffith, ARTHUR** (1872-1922).

First president of the Irish Free State and founder of Sinn Féin (q.v.). Born March 31, 1872, in Dublin, where he was educated by the Christian Brothers, he was apprenticed to a printer at 15; two years later he founded, with William Rooney, the Celtic Literary Society. He emigrated in 1897 to S. Africa, but returned to Dublin in 1899 to begin a career as journalist and pamphleteer. Among many unpaid contributors to his papers were Yeats and "A.E." The United Irishman, founded 1899, became known, after bankruptcy, as *Eire*. In 1904 Griffith published *The Resurrection of Hungary*, which was to become the text-book of the new Irish nationalist movement. In 1906 he founded Sinn Féin as a daily, which gave its name (*We Ourselves*) to a vigorous political movement.

Griffith emphasised the need for an Irish industrial revival, and never advocated physical violence. Although he joined the Irish Volunteers in 1913 and took part in the gun-running exploit at Howth (q.v.), he was not concerned in the Dublin insurrection of 1916. He was later arrested by the British, released, and again detained. While interned in England in 1918 he was twice elected M.P. (Sinn Féin) for East Cavan. Released at the general amnesty, he was chosen acting president of the illegal Dáil Éireann in 1920. With Michael Collins and other ministers he signed the Anglo-Irish treaty of Dec., 1921. Scarcely had he become president of the I.F.S. when he fell dead, Aug. 12, 1922. Griffith was a man of high ideals and honour as well as a brilliant controversialist.

**Griffith, DAVID WARK** (1880-1948). American film director. Born in Kentucky, Jan. 22, 1880,

he appeared in a film, *The Eagle's Nest*, 1907, and directed his first picture, *The Adventures of Dolly*, 1908. He evolved screen technique of far-reaching significance, bringing into artistic prominence methods of emphasis, e.g. close-up, fade-out, cut-back, and dissolve. His masterpiece was *The Birth of a Nation*, 1914. *Intolerance*, 1915; *Broken Blossoms*, 1920; and *Way Down East*, 1921, were outstanding for tension, use of rhythm, and the principle of slow and quick cutting. Griffith later made *Orphans of the Storm*; his first talking picture, *Abraham Lincoln*, appeared 1931. He died July 23, 1948. See *Cinematography*.

**Griffith, FRANCIS LEWELLYN** (1862-1934). British Egyptologist. He conducted excavations in Egypt in 1884, becoming an assistant at the British Museum in 1888. He was reader in Egyptology at Oxford, 1901-24, professor until 1932; the Griffith institute there perpetuates his memory. His greatest work was in the deciphering of papyri; and he became an acknowledged master of the translation of hieroglyphics. He died March 14, 1934.

**Griffith, SIR SAMUEL WALKER** (1845-1920). Australian politician. Born at Merthyr Tydfil, June 21, 1845, he emigrated young to Australia. Educated at the university of Sydney, in 1867 he was called to the bar. Having settled in Queensland, he became associated with its politics and in 1883 was made premier. He held the office until 1888, and again 1890-93, after which he was chief justice of Queensland. He had much to do with drawing up the constitution of the Commonwealth of Australia, and in 1903 was chosen its chief justice. Retiring 1919, he died at Brisbane, Aug. 9, 1920. He had been a knight since 1886.

**Griffith Observatory**. American observatory on Mt. Hollywood, near Los Angeles, Calif. It was given to Los Angeles by the will of Col. J. Griffith and was opened May 14, 1935. It included a 12-in. refracting telescope, a planetarium theatre, and the hall of science. Exhibits include a million-volt Tesla coil, polarised light, spectra of gases, and geological formations.

**Griffiths, JAMES** (b. 1890). British politician. He was born at Ammanford, near Swansea, and educated at a council school and the Labour College, London. He was secretary of the Ammanford trade council, 1916-19, and presi-



Arthur Griffith,  
first president of  
the Irish Free  
State

dent of the South Wales Miners' Federation, 1934-36. Elected Labour M.P. for Llanelli, 1936, he was a member of the party executive 1939-56, minister of National Insurance, 1945-50, Colonial secretary, 1950-51.

**Griffon.** A highly intelligent toy dog of Belgian origin, introduced into England at the end of the 19th century. There are two varieties,



Griffon. The Brussels griffon, a terrier-like miniature dog

Griffon Bruxellois, rough coated, and Petit Brabançon, smooth coated. The Griffon is compact and cobby, with short back, large head, pushed back nose; the jaw is slightly undershot. Rough coats should be harsh and wiry, smooth coats short and smooth, clear red, black, or black-and-tan in colour.

**Grigg, Sir (Percy) James** (b. 1890). British civil servant who became a secretary of state. Born at Exmouth, Dec. 16, 1890, he was educated at Bournemouth and S. John's College, Cambridge, and entered the Treasury in 1913. During 1921-30 principal private secretary to successive chancellors of the Exchequer, he was chairman of the board of Inland Revenue, 1930-34, and was made K.C.B. 1932. Appointed permanent under-secretary for War in 1939, he was secretary for War 1942-45, sitting as Nationalist M.P. for East Cardiff. He was executive director of the International Bank for Reconstruction and Development, 1946-47.

**Grigorescu, Nicolas** (1838-1907). Rumanian painter. Born at Vacareshti-Restoaia, Rumania, May 15, 1838, the son of an agricultural labourer, he was saving his wages as a painter of icons to enable him to study in Paris, but was persuaded to remain in his native land to produce pictures for churches and monasteries. But the call to Paris proved irresistible, and in 1861 he was received into the congenial society of the Barbizon school. The forest scenery provided many themes for his brush, and his *Sunset at Barbizon*

—now in the Simu Museum at Bukarest—ranks as his masterpiece in landscape. Returning to Rumania, he was captivated by the manners of the gipsies, Jews, and shepherds of the Danubian states and incidents in their lives inspired several of his best pictures.

In 1870 he again made his home in France, but in 1877 he hastened to bear his part in the campaign against the Turks, of which he left a magnificent memorial in his *Attack at Smardan*, purchased by the government for the town hall at Bukarest. Portraiture also attracted him, and his portraits of his king and queen ("*Carmen Sylva*") are among his most brilliant works. He died at Campina, in Rumania, July 21, 1907, universally regarded as the greatest painter his country had produced.

**Grigorovich, Dmitri Vasilievich** (1822-1900). A Russian novelist. More or less inspired by George Sand, he began with *The Village*, 1846, a series of remarkable stories rendering with great faithfulness the conditions of the peasantry under the system of serfdom. Other of his works were *Anthony the Unlucky*, 1848; *The Valley of Smiedov*; *The Fishers*, 1853; and *The Colonists*, 1855. His stories, though lacking in literary skill, possess a lasting value as ethnographical studies.

**Grijalva.** River of S.E. Mexico. Named after its discoverer, Juan de Grijalva, the Spanish explorer, it rises in Guatemala, and flows 300m. W., N.W., and N. to the Gulf of Campeche, near the Bay of Tupilco. For a part of its course it forms the boundary between the states of Chiapas and Tabasco. It is navigable for about 50 m.

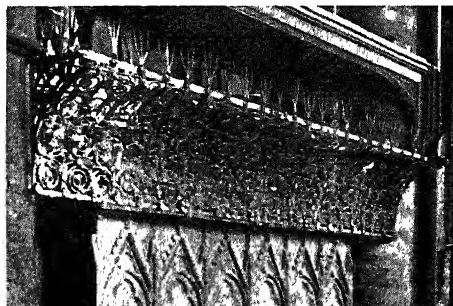
**Grille.** Don. Pen-name adopted for his earlier writings by the American short-story writer Ambrose Bierce (q.v.).

**Grille.** French word meaning literally a grating of metal or wood, used to screen a window or other aperture. The close iron grating in prison cells through which prisoners converse, without being able to come into personal contact with their visitors, is called a grille. The grille was the name given to the barrier behind which women formerly heard debates in the house of commons. This

was removed in 1918. Tombs are often protected by grilles. A beautiful example is the one surrounding Queen Eleanor's tomb in Westminster Abbey.

**Grillparzer, Franz** (1791-1872). Austrian dramatist. He was born in Vienna, Jan. 14, 1791, and after studying law entered the Austrian civil service in 1813, remaining in it until he retired with a pension in 1856. At the age of 25 he made his first great dramatic hit with *Die Ahnfrau* (The Ancestress), a ghost tragedy that made him famous. It was followed by a succession of pieces that made the author's name the most notable in Austrian literature. His other early plays included *Sappho*, 1819 (several Eng. trans.); a trilogy on *Das Goldene Vliess* (The Golden Fleece), 1821; and *König Ottokar*, 1825, an historical play on a 13th century king of Bohemia.

In 1826 Grillparzer visited Goethe at Weimar. In 1828 came another historical play, *Ein treuer Diener seines Herrn* (A Faithful Servant); then came *Des Meeres und der Liebe Wellen* (The Waves of the Sea and of Love), 1831, the story of Hero and Leander; and *Der Traum, ein Leben* (The Dream, a Life), 1835; these two plays were long leading favourites on the German stage. In 1838 his comedy *Weh' dem der lügt* (Woe to Him Who Lies) proved a failure and disheartened the author. He had earlier published a volume of poems and on Jan. 21, 1848, produced his chief prose story, *Der arme Spielmann* (The Poor Fiddler). He died in Vienna, Jan. 21, 1872, leaving three unacted plays, *Die Jüdin von Toledo* (The Jewess of Toledo); *Ein Bruderzwist im Hause Habsburg* (A Brother's Quarrel in the House of Habsburg); and *Libussa*, a fine drama on the queen-founder of Prague, perhaps his most profound work. His collected works were published in 20 vols., at



Grille. Triple metal spikes (candlesticks) surmount the grille around Queen Eleanor's tomb in Westminster Abbey



Stuttgart, 1892-94, and in 1890 a Grillparzer Society was founded in Vienna.

**Grimaldi, JOSEPH** (1779-1837). English clown. Born in London, Dec. 18, 1779, and belonging to a family of clowns and dancers, he danced at Drury Lane and Sadler's Wells when quite an infant, and made his greatest success in the pantomime of Mother Goose at Covent Garden in 1806. His singing of such ditties as Tippetty-Witchet and Hot Codlins aroused great enthusiasm. He died in London, May 31, 1837. His Memoirs were edited by Dickens, 1838.

**Grime's Graves.** Flint mines at Weeting near Brandon, Norfolk, worked in the Neolithic and Bronze Ages, first explored in 1870 by Canon Greenwell. Within 20 acres there are 254 pits, 20 ft. to 60 ft. across, and 40 ft. deep, often with lateral tunnels. Red-deer antler picks, chalk-cup lamps, and a primitive shrine were found.

**Grimm, JAKOB LUDWIG KARL** (1785-1863). German philologist.

Born Jan. 4, 1785, at Hanau, he studied law at Marburg, visited Paris in 1805, and in 1808 became librarian to Jerome Bonaparte at Cassel. His first book, on the Meister-singers, 1811, was followed in 1812 by the collection of Kinder- und Hausmärchen, made by him

and his brother, and continued in 1814 and 1822. These tales, translated into many languages, in English as Grimm's Fairy Tales, have immortalised the brothers Grimm.

In 1829 Jakob went to Göttingen as librarian and lecturer, accompanied by his brother, but political changes led to their dismissal. In 1840 both were invited to professorships in Berlin. Jakob's most important works are

Deutsche Grammatik, 1819, and Geschichte der deutschen Sprache, 1848, which revolutionised the



Joseph Grimaldi, the clown, in Harlequin and Friar Bacon  
From a sketch by G. Cruikshank

study of Teutonic philology; Deutsche Reichsalterthümer, German Legal Antiquities, 1828; Deutsche Mythologie, 1835, Eng. trans. 1879-88. The brothers began a German Dictionary and edited many old German classics. Jakob died, Sept. 20, 1863.

His younger brother, Wilhelm Karl (1786-1859), born at Hanau Feb. 24, 1786, after holding a post in the Cassel library, became sub-librarian at Göttingen in 1830, and professor at Berlin in 1840. His whole life was the counterpart of his brother's. His chief independent work was Die deutsche Heldensage (German Heroic Saga), 1829. He died Dec. 16, 1859. See Philology.

**Grimmelshausen, HANS JAKOB CHRISTOFFEL VON** (c. 1625-76). German author. Born at Gelnhausen, near Hanau, Prussia, he was carried off at the age of ten by Hessian troops, and led an adventurous life with the army as camp follower and soldier of fortune. After the conclusion of the Thirty Years' War in 1648, nothing is known of him until 1667, when he was chief magistrate of Renschen, in the Black Forest.

Two years later Grimmelshausen published what has been described as the one German prose classic of the 17th century, The Adventurous Simplicissimus (Eng. trans. 1912). It is an extraordinary medley of adventure and observation, largely based on its author's own experiences. Occupying an important place in the annals of picaresque fiction, Simplicissimus throws valuable light on the social side of the Thirty Years' War, while its closing chapters on its

hero's desert-island experiences might have inspired Defoe's Robinson Crusoe. Grimmelshausen wrote many other works under various pseudonyms, mostly anagrams of his name.

**Grimm's Law.** In philology, the name given to the regular sound-shifting or consonantal interchange between (1) Sanskrit, Greek, and Latin; (2) Low German; (3) High German. The rule is that an aspirate in (1) corresponds to a soft consonant in (2) and to a hard consonant in (3); a soft consonant in (1) corresponds to a hard consonant in (2) and an aspirate in (3); a hard consonant in (1) corresponds to an aspirate in (2) and to a soft consonant in (3): Greek, thura, English door, German Tor; Greek thēr, English deer, German Tier; Latin dens, English tooth, German Zahn.

Many apparent exceptions have been explained by what are known as Verner's and Grassmann's Laws, and others will probably be found to be the result of other phonetic laws not yet discovered. Grimm's Law takes its name from the philologist, Jakob Grimm (*q.v.*), who first definitely formulated it, although the principle had already been enunciated by a Danish scholar, Rask. See Philology.

**Grimsby or GREAT GRIMSBY.** Co. bor. of the Parts of Lindsey, Lincs, England. It stands



Grimsby arms

near the mouth of the Humber, 15 m. S.E. of Hull, and 168 m. N. of London on a main line from King's Cross. The chief buildings include the parish church of St. James, a 13th century building; town hall, corn exchange, and custom house. There are a 16th century grammar school, public library, nautical school, and benevolent institution for seamen. The principal industry is fishing; Grimsby has some 300 steam trawlers, being probably the largest fishing centre in the world.

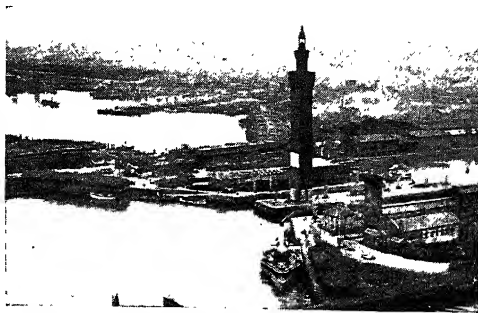
About a quarter of a million tons of fish are landed annually. There is an import and export trade, especially in coal, machinery, timber, grain, iron, and dairy produce. Other industries are shipbuilding and repairing, paper making, brewing, rope making, chemical production, and flour milling.

Grimsby was a Danish settlement and received its first charter as a borough in 1201. It was soon a flourishing port, but after a time entrance to it was



Wilhelm Grimm

made difficult by the accumulation of sand. In the 19th century it was a fishing centre. Docks were built, a great extension being made by the Manchester, Sheffield and Lincolnshire rly. during 1849-54. During both Great Wars the trawlers and fishermen were



Grimsby. The hydraulic tower at Grimsby docks, a well-known landmark on the river Humber

employed in mine sweeping, patrolling, etc. Thousands of buildings were damaged in 28 German air raids of 1940-45. Grimsby forms a bor. constituency. Market days, Mon., Tues., Fri., Sat. Pop. (1951) 94,577.

**Grim's Dyke** or **GRIM'S DITCH**. Folk name, probably Norse in origin, given to many prehistoric, Roman, or Anglo-Saxon earthworks in Britain. There are examples in Dorset, Wilts, N. Oxfordshire, Berks, Middlesex, Essex, and elsewhere. Grim appears to signify the Devil and some earthworks are called both Grim's Dyke and Devil's Dyke. In Scotland, Grim also appears as a legendary character, Graeme, Graham, or Gryme after whom, according to a 14th-century chronicler, the Roman Forth-Clyde dyke was named.

**Grimsel**. A mountain pass of Switzerland, in the Bernese Alps. It leads from the valley of the Aar, in the canton of Berne, to that of the Rhône in Valais, and reaches an alt. of 7,150 ft. From Meiringen the road leads past Handegg, joining the Furka route W. of the Rhône glacier. There is an old hospice near the Grimsel lake, and beyond is the Todtensee or Lake of the Dead.

**Grimspound**. Walled Bronze Age village on Dartmoor, Devon, between Widecombe and Shapley. Sited on a gentle slope, for drainage, it contains remains of about 24 circular huts, some of which have small projecting walls to screen the doorway from the wind. The enclosure wall or "pound" of dry stone, once about 8 ft. high, served to defend the village flocks and herds against animal and human foes.

**Grimthorpe**, **EDMUND BECKETT**, 1ST BARON (1816-1905). British lawyer. Born May 12, 1816, a son of Sir E. B. Denison, whose surname he dropped on inheriting the baronetcy, he went to Eton and Trinity, Cambridge. Called to the

bar at Lincoln's Inn in 1841, he became Q.C., 1854, and was chancellor and vicar-general of the province of York, 1877-1900. He was a vigorous controversialist in ecclesiastical and architectural matters, as shown in the restoration of S. Alban's Abbey carried out under his sole direction and at his expense. The term "Grimthorping" was applied to any ruthless restoration of ancient cathedrals. He also designed the clock tower of the houses of parliament at Westminster.

Beckett was made a peer in 1886 and died April 29, 1905, having made a fortune as a lawyer at the parliamentary bar.

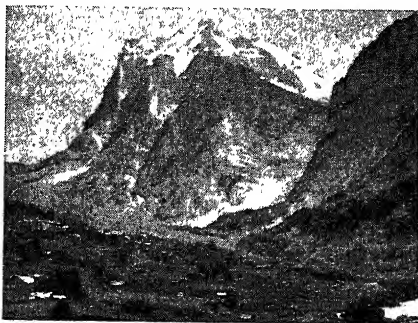
**Grindal**, **EDMUND** (c. 1520-83). English prelate. The son of a farmer, he was born at St. Bees and educated at Cambridge. Ordained in 1544, he became known as a religious reformer. Ridley secured promotion for him, one post being that of chaplain to Edward VI, but on the king's death he left England for Frankfurt. He returned in 1559, Mary being dead, and was made master of Pembroke Hall, Cambridge, and bishop of London in succession to Bonner.

Grindal showed little desire to punish Nonconformists, and is usually regarded as a weak ruler of his diocese, which he left in 1570 to become archbishop of York, where again he was less zealous than the extremists liked. In 1575 he was chosen archbishop

of Canterbury, where he was strong enough to refuse to obey Elizabeth when she ordered him to suppress the prophesyings or meetings of Puritan clergy. He was therefore suspended from the non-spiritual duties of his office and not restored to these until 1582. Grindal died at Croydon, July 6, 1583.

**Grindelwald**. Valley of central Switzerland, in the Bernese Oberland. It is 13 m. long by 4 m. broad, and its rly. station is 11 m. S.E. of Interlaken. The Black Lütschine river flows through the valley, which is enclosed by the peaks of the Wetterhorn, Schreckhorn, Mettenberg, Eiger, and Faulhorn. Two glaciers descend almost to the river.

A favourite excursion centre in both summer and winter, it has many hotels and shops between



Grindelwald, Switzerland. The Bernese valley, looking east towards the Wetterhorn

the hamlet of Gydisdorn and the rly. station. A wooden church was replaced by a stone one about 1180, which in turn was superseded by the present church, 1793. The valley lies at an alt. of 3,410 ft. and has good pasturage as well as some orchards. The inhabitants are mostly German-speaking Protestants.

**Grinding**. Term formerly applied almost exclusively to the sharpening of tools, cutlery, etc., or the smoothing of any hard substance by rubbing away its surface. Crushing and pulverising machinery were also included (e.g. flour milling, pulverised fuel, preparation of Portland cement). Latterly, however, the use of grinding machines for accurate production of interchangeable components of engines and machinery has become standard practice in large engineering works.

The grinding or sharpening of tools, cutlery, etc., is carried out on rapidly revolving power-driven wheels. In tool grinding the whole operation is carried out mechani-



Edmund Grindal, English prelate  
After De Vos

cally to ensure an accuracy of the angles of the cutting edges of such tools as drills, impossible with hand-ground tools. Most of the process is wet grinding, *i.e.* water or other fluid is supplied when the wheel makes contact with the work. Dry grinding is still used for pointing needles and prongs of forks, finishing steel pens, etc.

For smoothing purposes various methods are used. Brass and bell work call for powdered pumice stone; a sand blast serves for cleaning, sharpening, frosting, etc. The sand blast is particularly useful for resharpening worn files. For grinding glass lenses and metal specula emery powder is used; and for jewels diamond dust. Plate glass is ground flat by grinding two sheets of the glass together with increasingly firm layers of suitable material.

#### Absolute Accuracy Essential

Grinding machines for production of finished parts must be constructed as accurately as any other; since an error of as little as 0.0005 in. may be sufficient to condemn the part operated on. Provision must be made to prevent the particles of abrasive material torn from the wheel from reaching the sliding surfaces of the machine. Usually the part to be ground is machined to within a few thousandths of an inch by ordinary cutting tools, so that the grinding wheel will not be subjected to appreciable wear during use.

Operations may be classified as (1) grinding of flat surfaces; (2) external grinding of cylindrical surfaces; (3) grinding of internal cylindrical surfaces (*e.g.* bores of motor car cylinders); (4) grinding of wheel teeth accurately to shape. "Centreless" grinding is also used for rapid finishing of small cylindrical parts to size. Machines may be (a) those in which the position of the grinding wheel is fixed during the operation, while the work moves longitudinally; (b) those in which the wheel moves axially along or radially across the work, which rotates or remains fixed. In class (a) the drive to the wheel is simpler, but the traversing of the work may introduce difficulties. Class (b) is more generally used for short pieces of work.

Grinding wheels are made up of grains of abrasive material held in position by a bonding material. Abrasive materials may be emery, corundum, and quartz, or manufactured products of the electric furnace, such as fused aluminium oxide and silicon carbide. The

nature of the bond depends upon the use to which the wheel is to be put; most widely used is the vitrified bond, of clay, feldspar, and flint, moulded to shape and vitrified at 2,400° F. Size and spacing of the grains will depend upon the nature of the operation. Surface speeds vary between 4,500 and 6,000 ft. per min.

**PRODUCTION GRINDING.** The enormous improvement in the manufacture of artificial abrasives opened the way to the large-scale use of grinding methods for shaping and forming metal, plastics, and substances otherwise turned in a lathe or shaped in a milling machine. The artificial abrasive materials are ground and pulverised to a number of standard grain sizes, and processed to furnish standard grades of hardness. The wheels are made in many shapes, ranging from a solid disk to a hollow, cupped shape; and in sizes from a tiny wheel used to form the screw-threads on a machine tap to one a yard in diameter. Steel parts which used to be machined in the soft, untempered state were apt to warp or become distorted in subsequent heat treatment. When grinding is substituted, the part may be first hardened and tempered, and then threaded by a grinding wheel, so obviating any subsequent distortion. *See* Abrasives; Carborundum; Emery.

**Gringo.** Colloquial term employed in the Latin American republics to designate a traveller or settler of other European origin, especially British or Anglo-American. Like Dago (*q.v.*), it came into use in the 1880s, and is apparently a variant of Griego (Greek).

**Gringoire, PIERRE** (c. 1480–1539). French dramatist. Having produced *Le Chasteau de Labour*, a didactic poem, 1499, he was frequently commissioned to write plays for Philip of Austria. In the society of *Enfants sans Souci*, he held the highest office, that of *Prince des Sots*. He had great influence on contemporary drama, and in his entertainments used political propaganda. In poems and moralities he attacked church and pope, but for his last 20 years the "French Aristophanes" was orthodox.

A French daily newspaper of the same name, famous for political cartoons, was one of the most popular journals of the Right. During the German occupation of France, 1941–45, Gringoire favoured collaboration, and after the liberation was suppressed.

**Grinnell Land.** This is part of Ellesmere (*q.v.*), an island of N. America.

**Griqualand East.** Part of the Transkeian Territories in the N.E. of Cape Province, S. Africa, lying S.E. of Basutoland and S.W. of Natal. Annexed to Cape Colony in 1875, it was named after the Griquas, a tribe of mixed Dutch and native descent. The chief Adam Kok III led 3,000 followers in an epic trek over the Drakensberg to found Kokstad, now the capital with a pop. of 5,588. Although the Griquas received a treaty on favourable terms, they were unsatisfactory settlers, and most of them sold out. Griqualand East is a fertile, healthy, and picturesque country, with an area of 6,602 sq. m. and a pop. of 17,306 whites and 1,100,000 natives.

**Griqualand West.** Region of Cape Province, S. Africa, lying N. of the Orange river and W. of the Orange Free State. It was annexed by Great Britain, Oct. 17, 1871, after an arbitration court had decided that it was the property of the Griqua chief Waterboer and not part of the Orange Free State. It was annexed to the Cape in 1877, but not actually incorporated until 1880. The discovery of diamonds at Kimberley (*q.v.*) in 1867 attracted immigrants to this district. De Beers, Belmont, Barkley West, and Griquatown (the capital until superseded by Kimberley) are mining centres. The area of the region is 15,197 sq. m.

**Gris, JUAN** (1887–1927). Spanish painter. José Victoriano González was born in Madrid, March 23, 1887. His parents intended him to be an engineer, but at 19 he went to Paris. First exhibiting at the *Salon des Indépendants* in 1912, he worked with Picasso and Matisse, and in 1926 executed the décor for three ballets for Diaghilev. He died May 11, 1927. Gris, whose work was strongly influenced by the Cubists, was one of the few Spanish painters to dominate the Post-Impressionist world of Paris. His pictures were purchased by leading European galleries, and in 1936 a complete exhibition was held in London.

**Grisaille** (Fr. *gris*, grey). Species of grey colour obtained by mixing black and white in varying proportions. Grisaille is a valuable medium for monochromes, is common in stained-glass windows and mural decoration, and is used freely, *e.g.* by Van Dyck, for sketches. The ancient Greek painters, who knew nothing of

chiaroscuro, found grisaille helpful in their schemes of gradation and modelling, as it enabled them to represent the appearance of relief. Once it was employed by many artists for blocking in their subjects, but the practice was condemned when the intermixture of white was excessive, because this dried rapidly and did not blend with the colours of the over-painting.

**Griselda**, GRISSELL, GRIZZLE, OR GRISELDIS. Heroine of traditional fiction. She is regarded as the model of wifely obedience and patience. Her story, generally derived from Boccaccio, who may have got it from an earlier source, has been told by Petrarch, by Chaucer (in the Clerk's Tale), has several times been treated dramatically, in Germany by Hans Sachs (1546), in England by John Phillip (1565), Henry Chetile (1603), and others, and has been rendered in ballad form.

**Grisette** (Fr. *gris*, grey). Name given in France to a girl or young woman of the working class. It implies a certain capacity for enjoyment and an absence of restraint, but not necessarily immorality. The name was given because the girls were usually dressed in garments made of a woollen cloth called grisette from its grey colour.

**Grisi**, GIULIA (1811-69). Italian singer. Born at Milan, July 28, 1811, she made at 17 her first



Giulia Grisi,  
Italian singer

appearance as a professional soprano in Rossini's *Zelmira*. In 1832 she made her reputation in the same composer's *Semiramide*. At the Théâtre des Italiens, Paris, she regularly appeared until 1849; she first came to London in 1834. One of the quartet which included Rubini, Tamburini, and Lablache, and one of the great operatic singers of the century, she died in Berlin, Nov. 29, 1869.

Her sister Carlotta, ten years younger, appeared as a dancer in Paris in 1840, and next year created the title rôle in the ballet *Giselle*.

**Gris Nez** (Fr., grey nose). Cape of France, in the dept. of Pas-de-Calais, on the Strait of Dover at its narrowest point. It is the nearest part of France to the English coast. Many Channel swimmers have started their attempts at this point (see Channel Swimming). In the Second Great War,

Canadian troops overcame the last of the German garrison at Gris Nez on Sept. 29, 1944, capturing the big gun batteries that had been bombarding Dover and other towns for four years.

**Grison** OR HURON (*Galictis*). Carnivorous mammal of the weasel family found in S. America and Mexico. It is about as large as a marten, and is grey on the back and dark brown on the underparts, with yellow tips to the tail and ears. It lives in hollow trees and clefts in the rock, and preys upon small birds and mammals.

**Grisons** (German *Graubünden*). Easternmost and largest canton of Switzerland. It is bounded N. and E. by Austria and S. by Italy, and has an area of 2,746 sq. m. Composed of the basins of the Upper Rhine and the Inn, with that of two tributaries of the Ticino and one of the Adda, it is almost wholly mountainous, comprising most of the ancient Rhaetia. There are many mineral springs, forests, and mt. pasturages, the lower ones sustaining a fine breed of cows. The climate is generally severe, and the vegetation alpine, though the vine and maize are grown in sheltered spots.

The capital is Coire or Chur; other towns are Dissentis, Davos, St. Moritz, and Arosa, all renowned for winter sports. The canton includes the Engadine or upper valley of the Inn, noted for its scenery. One of the most sparsely populated cantons, of its pop. nearly half are R.C. and German-speaking, and the rest speak Romansch or Italian—all three languages being official. Pop. 128,247.

Until 1798 the canton consisted of three leagues—the League of God's House (1367), the Grey League (founded 1395), and that of the Ten Jurisdictions (1436). These combined in the Three Perpetual Leagues in 1471. After a troublous history Grisons joined, 1799-1801, the Helvetic Republic, and in 1803 the Swiss Confederation.

**Grist** (A.S., to grind). Word originally applied to the act of grinding corn. It came to be used for the corn ground and the meal produced, and colloquially for anything that is a source of profit. Grist is also used for a size of rope; e.g. common grist is a rope 3 ins. in circumference.

**Grit**. Consolidated sand of which the particles are angular and comparatively coarse. The term has local significance in many districts. See Sand; Sandstone.

**Grizzly**. Name of a large bear. The word means rather grey. A powerful creature, the grizzly inhabits the mountainous districts of the west of Canada and the U.S.A. It is much larger and heavier than the brown bear, which to some extent it resembles, and is dangerous when attacked or hungry. See Bear.

**Groat** (Low German *grote*, great). English silver coin, now demonetised. The groat was first



Groat. Two sides of the coin minted by Edward III, 1 1/2 ins. diameter

issued in England by Edward III in 1351, minted at London and York, its original value being one penny, but coming to have the value of fourpence. A new issue was made by Henry VII, but the groat was discontinued in 1662. It was revived as a silver fourpenny piece by William IV in 1836, and the fact of its issue having been advised by Joseph Hume gave it the popular name of the "Joey." Issue was dropped in 1856, and it was demonetised in 1887.

The Scots groat was issued at Edinburgh by David II in 1358, and James V coined a 1/4 groat in 1527. An Irish groat was issued by Henry VI in 1460. See Coinage.

**Grocer**. Originally grosser, one who sold goods by *peso grosso*. In modern usage the word is applied to a retailer of tea, sugar, coffee, spices, etc., which are known collectively as groceries. In medieval times he was known as a spicer. In the U.K. the grocers have a regular trade organization, their own journals, etc. The term greengrocer for a vendor of green-stuffs is analogous.

**Grocers' Company**. Second of the twelve great livery companies of the City of London. It



Grocers' Company arms

had its origin in a fraternity of St. Anthony founded May 9, 1345, by 22 members of the Ancient Guild of Pepperers; their duties included that of "garbling," or preventing adulteration of drugs and spices, and the charge of the King's Beam, which weighed all merchandise sold by *peso grosso*,

whence the name grocer is probably derived. In 1427 was acquired the site in Princes St. on which the present Grocers' Hall stands; in 1428 the original hall in Old Jewry was finished and the first charter granted.

The Great Fire of 1666 nearly ruined the company, destroying not only its hall but property in the city. The hall was rebuilt and let as a residence for the lord mayor. In 1694 it was leased to the newly-formed Bank of England, of which Sir John Houblon, a grocer, was the first governor.

Charles II was an honorary member of the company, and William III accepted the office of sovereign master in 1689. Freemen and honorary members included George V as duke of York, Sir Philip Sidney, William Pitt (whose portrait hangs in the hall), Sir Robert Peel, Lord Roberts, and A. J. Balfour. A bequest of property in 1556 led the Grocers' Company to found Oundle School. It endowed scholarships and gave freely to hospitals, in particular to Lister Institute and the London Hospital, for which it built a new wing in 1876.

**Grock.** The stage name of a Swiss clown, whose real name was Charles Adrien Wettach. Born on Jan. 10, 1880, he made an international reputation, and was especially popular in Paris and in London, where he made frequent appearances. Difficulties over income tax in 1924 were said to have led him to desert the English stage, though he did not retire until 1954. Grock ranked among the great clowns for his inimitable and infectious appreciation of his own jokes and his tragicomic miming.



Grock,  
Swiss clown

**Grocyn, WILLIAM** (c. 1446-1519). English classical scholar. He was born at Colerne, Wilts, and educated at Winchester and New College, Oxford, of which he was fellow, 1467-81. A friend of More, Linaere, Colet, and Erasmus, who called him his *patronus et praeceptor*, he studied in Italy, 1488-90, under Politian and Chalcondyles, was a pioneer of the New Learning, and among the first publicly to teach Greek at Oxford. While in Italy he made the acquaintance of the printer Aldus Manutius (q.v.). He was divinity reader at Magdalen College, 1481-

88, prebendary of Lincoln cathedral, held benefices at Newton Longueville, Deepdene, London (S. Lawrence Jewry), Shepperton, and East Peckham, and was master of All Hallows, Maidstone.

**Grodno.** Town of White Russia, capital of a region of the same name. It lies on the river Niemen 150 m. W. of Minsk, and 10 miles E. of the Polish frontier. It is connected by rly. with Warsaw and Leningrad. There are cloth, silk, tobacco, soap, and machinery factories, and trade is done in corn, timber, and hemp. Near by are the mineral springs of Duskeniki. Grodno region produces grain and potatoes; pigs are raised and there is dairying, tanning, and sawmilling. Pop. (est.) town, 60,000; region, 600,000.

Once part of the principality of Lithuania, after the Polish-Lithuanian union in 1569 Grodno became one of the meeting places of the combined diet. The second partition of Poland was signed here, 1793. A battle was fought at Grodno between the German and Russian armies, Sept. 1-4, 1915; the Germans carried the forts on the W. and N. sides and entered the town, but the Russians developed a counter-attack and re-entered the town, retiring again with a considerable force that had seemed in danger of being surrounded. Grodno became Polish in 1923. In the Second Great War, the Russians entered Grodno without opposition, Sept. 22, 1939, and retained the place after the partition of Poland. German troops captured it June 22, 1941, on the invasion of Russia, and lost it again, July 16, 1944. Lying just E. of the Curzon Line, the town was ceded to the U.S.S.R. in 1945.

**Grog.** Burnt fireclay used in the manufacture of refractory bricks or crucibles. Normal unburnt clays contain a high proportion of water, and hence tend to contract rapidly when strongly heated. The contraction may be so rapid and irregular that it causes cracking and premature failure of the crucible or brick. Therefore some burnt clay, old crucibles or used fire-brick, is suitably ground and added to the clay before the bricks or crucibles are shaped. This stable material not only reduces the effect of contraction during firing, but stabilises the whole refractory during use. Grog also increases the resistance of bricks to erosion.

**Grog.** Name applied by sailors in the Royal Navy to their ration of rum. The word is said to be

derived from Old Grog, a nickname of Admiral Vernon, so called from his coarse, or program breeches. In the days of the four-wheeled cabs, cabmen used to drink rum mixed with hot water, a slice of lemon, and a bit of sugar, which they called grog.

**Grogging.** Name for an ingenious evasion of excise dues. Casks containing spirit absorb into the wood in time an appreciable quantity of spirit which can be extracted by rinsing and other processes. By the Finance Act of 1898 grogging and the possession of a cask so treated, or of any spirit obtained by the process, are offences punishable by a fine of £50.

**Groin.** In architecture, the angle formed by the intersection of arches or vaults. Groined vaulting is so called to distinguish it from barrel or other forms of arch construction in which no such intersection takes place. See Gothic Architecture.

**Grolier, JEAN, VICOMTE D'AGUTISY** (1479-1565). French book collector. Born at Lyons, he entered the French diplomatic service, and was ambassador in Milan and Rome. He began collecting books, which he had splendidly bound and generally lettered in Latin with the legend "Jean Grolier and his friends." In 1537, on his return to France, he became treasurer under Francis I. Ten years after his death, which occurred Oct. 22, 1565, his famous library of about 3,000 volumes was sold; a number of the books are in the Bibliothèque Nationale, Paris, others in the British Museum. The Grolier Club, New York, founded in 1884 to encourage the application of art to book production, was named after him. See Bookbinding.

**Gromwell** (*Lithospermum*). A genus of annual and perennial herbs and shrubs of the family Boraginaceae. Natives of Europe, temperate Asia, and N. America, they have bristly or hairy alternate leaves, and funnel-shaped, white, blue, or yellow flowers in clusters. Common gromwell (*L. officinale*) has greenish-yellow flowers; in corn gromwell (*L. arvense*), an annual, they are creamy-white; and in purple gromwell (*L. purpureo-caeruleum*) they are bright blue-purple.

**Gromyko, ANDREI** (b. 1909). Russian diplomatist. He was born July 5, 1909, in the district of Gomel. He graduated from the Minsk institute of agricultural economics, and was appointed to the scientific staff of the institute of economics. In 1939 he

was chief of the division of American countries in the people's commissariat of foreign affairs, resigning soon to go to Washington. Succeeding Maxim Litvinov as ambassador to the U.S.A. in 1943, he led the Russian delegation at the Dumbarton Oaks and San Francisco conferences. Gromyko was chief U.S.S.R. representative at the U.N. assembly, 1946, and permanent Russian representative on the security council, being released from his duties as ambassador in April. In Oct. he became a deputy foreign minister, in 1949 first deputy. Ambassador to the U.K. 1952, in 1953 he was first deputy foreign minister, in 1957 foreign minister.

**Groningen.** Province of the Netherlands, bounded N. by the North Sea, N.E. by the Dollart, W. by Friesland, E. by Germany, S. by Drenthe. Area 895 sq. m. It is flat and swampy in the S.E., with good grazing land in the N. The prov. is mainly agricultural, though there are industrial and shipping industries and coast fishing is carried on. The few rivers are unimportant. Groningen suffers from sea encroachment and has to be protected by a system of dykes and embankments. The chief towns are Groningen, the capital, Delfzyl, Appingedam, and Winschoten. The principal products are wheat, barley, oats, flour, potatoes, rye, and oilseeds. Pop. (est. 1955) 465,300.

**Groningen.** A town of the Netherlands, capital of the province of Groningen. It stands at the junction of the Hunse with the Drentsche Aa, 32 m. by rly. E. of Leeuwarden. Intersected by numerous canals, it has wide streets and gabled houses of the 17th century, and is surrounded by boulevards on the site of the ramparts. Among the principal buildings are the Gothic Martini church, dating mainly from the 13th and 16th centuries, with a lofty tower and a fine organ; the university, founded 1636, had 1,611 students in 1946; a museum; the Stadhuis, built 1792-95; the 16th century law courts; the 13th century Gothic Aa chapel, rebuilt in Renaissance style in 1725. There is a large market.

Groningen is the most important town in the N. Netherlands, and carries on a large trade in grain and rape seed. Its harbour is accessible



Groningen, Netherlands. Martini church and the market place

to small sea-going vessels. The principal manufactures are textiles, tobacco, cigars, mirrors, furniture, machinery, sugar, and gold and silver articles; there are also large printing and lithographic establishments, and some shipbuilding.

Groningen is mentioned in the 9th century, and from the middle of the 11th century was under the bishop of Utrecht. A member of the Hanseatic League from 1282, it was taken by Prince Maurice of Orange in 1594, and successfully withstood a siege by Bishop Bernhard von Galen of Münster in 1672. The fortifications were razed in 1874. During the First Great War there was an internment camp here for British and Belgians. When German forces invaded the Netherlands on May 10, 1940, no attempt was made to defend the town or prov. Units of the Canadian 2nd division entered Groningen on April 14, 1945, and the Germans surrendered on April 16 after a fierce struggle in the centre of the town. In the course of the war 425 houses were destroyed. Pop. (est. 1955) 141,370.

**Gronov** or **GRONOVIVS.** Name of a family of German classical scholars and men of science, all connected with Leyden. Johann Friedrich (1611-71), a native of Hamburg, became professor of history and eloquence at Deventer and of Greek at Leyden. The founder of the Dutch school of Latinists, he edited a number of Latin classics. His son Jakob (1645-1716), professor of Greek

literature at Pisa and of belles-lettres at Leyden, is best known by his *Thesaurus Antiquitatum Graecarum*, a learned but undigested mass of information on Greek antiquities. Jakob's son, Abraham (1695-1775), was librarian of Leyden, and edited various classical authors. Another son, Johann Friedrich (1690-1760), was a well-known botanist, whose son, Lorenz Theodor (1730-77), was the author of works on zoology, especially ichthyology.

**Groom** (old Fr. *gromet*, boy). Term applied to a manservant in charge of horses. In addition to his stable duties, a groom is usually expected to accompany his master when riding. From its earlier and more general use for any male attendant, the word survives as the title of certain officials in the lord chamberlain's department of the British royal household, whose duties are to attend the sovereign. The groom of the stole is next to the vice-chamberlain and in charge of the stole worn on state occasions. There is a similarly styled appointment in the queen consort's household.

Groom in the word bridegroom is derived from the A.S. *guma*, man, cognate with the Lat. *homo*, the "r" having been intruded as a result of confusion with groom.

**Groombridge, STEPHEN** (1755-1832). British astronomer. Born Jan. 7, 1755, he succeeded to the

business of a linen-draper in Smithfield, and it was not till 1802 that he was able to study astronomy seriously. In 1806 he began compiling a catalogue of stars down to 8.9

magnitude, within 50° of the North Pole, and six years later he was made F.R.S. He had made some 50,000 observations and was engaged upon the completion of his catalogue when attacked by paralysis. Groombridge died March 30, 1832; his work was published in 1838, under the supervision of Airy.

**Groot, GERRIT DE** (1340-84). Dutch reformer, called in Latin Gerardus Magnus. Born at Deventer, he became a wandering preacher, and founded the Brothers of the Common Life (*q.v.*), a society which lasted until the Reformation. He also instituted



S. Groombridge, British astronomer  
From a print



Groningen town arms



houses of Augustinian canons. He died of the plague, Aug. 20, 1384.

**Groote Eylandt** OR GREAT ISLAND. Largest island in the Gulf of Carpentaria. It lies off the S.E. coast of Arnhem Land, N. Australia, and measures 40 m. in width and length. Its mountainous centre and barren shores have been little explored.

**Groote Schuur.** Official residence of the premier of the Union of S. Africa. It is near Rondebosch station, about  $3\frac{1}{2}$  m. S. of Cape Town, Observatory Road connecting the two. The house was formerly the residence of Cecil Rhodes, who built it, but there appears to have been one here before 1652. Near it is the Rhodes Memorial, the statue of Physical Energy, by G. F. Watts.

**Gros, ANTOINE JEAN, BARON** (1771-1835). A French painter. Born in Paris, March 16, 1771, he studied under David and in Italy. Having won the approval of Napoleon by his picture of The Battle of Arcola, he made him the central figure of many canvases, now in the Louvre and at Versailles: Napoleon Visiting the Plague-stricken at Jaffa, 1804, The Battle of Aboukir, 1806, Napoleon at Eylau, 1808, and The Battle of the Pyramids, 1810. After the Restoration Gros continued to paint in the grand manner, his chief work being the decoration of the dome of the Panthéon. Depressed at losing his hold on the public, he drowned himself in the Seine, his body being found at Meudon, June 26, 1835. *Pron.* Grō.



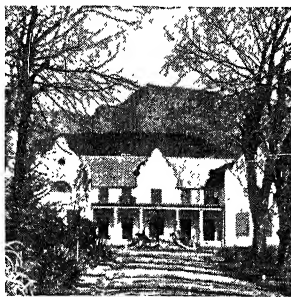
Antoine Jean Gros,  
French painter

**Grosbeak** (Fr. *grosbec*). Either of two birds of the finch family, nearly related to the hawfinch. The scarlet grosbeak (*Carpodacus*) frequents marshes; the pine grosbeak (*Pinicola*) is larger, and found in woodlands, common in the pine forests of N. Europe, and a rare winter migrant to Great Britain. The male is rosy pink, the female bronze. The birds have a large and massive beak. See Beak.



Grosbeak. Bird of  
the finch family

**Groschen.** A coin once current in many lands, whose name was derived from Lat. *grossus*, big.



Groote Schuur, near Cape Town,  
the official residence of the premier  
of South Africa

In Germany it arose after the Crusades as a larger, silver, multiple of the *pfennig*; in France it appeared in 1226 as the *gros tournois*; in Bohemia a Prague variety was coined. It was reduced in value and mostly made from copper in the 18th century, equaling  $\frac{1}{4}$ , later  $\frac{1}{5}$ , of a thaler, or  $\frac{1}{5}$  of a gulden or florin. England had its equivalent in the groat. Catherine I of Russia had a *grosch* circulating in Poland. In Italy a *grosso*, later in consequence of its depreciation called *grosseto*, circulated in the 13th-17th centuries. The name was revived for the smallest coin of Austria after the First Great War; one *schilling* being equal to 100 groschen, of about  $\frac{1}{2}$  penny each.

**Grose, FRANCIS** (1731-91). An English antiquary. Born at Greenford, Middlesex, the son of an opulent Swiss jeweller, he was Richmond herald, 1755-63, and became F.S.A. in 1757, but squandered his fortune. Prolonged tours resulted in his Antiquities of England and Wales, 1773-87. While collecting the material for his Antiquities of Scotland, 1789-91, he met Burns, who wrote warning brother Scots that "a chiel's amang ye takin' notes." Grose wrote on Ancient Armour and Weapons, 1785-89; Military Antiquities, 1786-88; and Antiquities of Ireland, 1791-97. He died in Dublin, June 12, 1791.

**Gross.** Numerical unit and measure of quantity. It equals a dozen dozen, i.e. 144, and is used in reckoning many classes of goods. A great gross is 12 gross, i.e. 1,728.

**Grossenhain.** A town of Eastern Germany. It stands on the Röder, 20 m. N.W. of Dresden, and is a rly. junction for Frankfurt-on-Oder, on the Berlin-Dresden line. It is a manufacturing

town with cloth factories. Other industries are connected with machinery, paper, and glass works. Grossenhain has been in many hands from time to time, falling successively to the Bohemians and the margraves of Meissen and Brandenburg. There was a battle here in 1813 between French and Russians. Pop. 13,293.

**Grosseteste, ROBERT** (c. 1175-1253). English prelate and scholar. Born of humble parentage at Stradbroke, Suffolk, and educated at Oxford, he became chancellor of the university, and in 1224 the first rector of the Franciscan school at Oxford. In 1235 he was elected bishop of Lincoln. He at once set himself to reform abuses in his diocese, and became one of the most resolute champions of the independence of the clergy. In 1239 he quarrelled with the Lincoln chapter over his right of visitation, a dispute which lasted six years, and was eventually decided by the pope in his favour. He was a profound Greek scholar, bringing Greek books to England and making Latin versions of them, and was a skilled physicist and mathematician. He died Oct. 9, 1253, and is buried in Lincoln cathedral.

**Grosseto.** Maritime prov. of Tuscany, Italy, at the head of the Tyrrhenian Sea. It is backed by a branch of the Apennines, rising in Mt. Amiata to 5,470 ft., and includes most of the Maremma. Mostly barren and unhealthy, it yields timber, quicksilver, and Siena earths. The malarial marshes of the ancient Lacus Prelihus have been reclaimed, and are now pastureland. The chief rivers are the Ombrone and the Albegna. Elba lies about 13 m. off the coast. The capital is Grosseto. Area 1,735 sq. m. Pop. (1951) 210,085.

**Grosseto.** Town of Italy, capital of the prov. of Grosseto. It stands near the Ombrone, 39 m. S.S.W. of Siena. Its handsome red-and-white marble cathedral, begun late in the 13th century and restored in 1855, and the 14th century citadel betray Senese influence. The cathedral cloisters were razed in the Second Great War, when Grosseto was the centre of an extensive system of German airfields. The town was captured by the 5th army, June 16, 1944. The Municipio holds a rare collection of bronzes, cinerary urns, and vases, besides other Etruscan relics. A few miles N.E. of the city are the sulphur baths of the ancient Rusellae, one of the 12 cities of the Etruscan League. Its cyclopean walls and ruins are still

extant, although the place was deserted about 1150.

The principal trade is in cattle, cereals, horses, and machinery. Dating from the Middle Ages, the bishop's see was transferred here from Rusellae about 1138. In summer the official headquarters are removed to Scansano, 20 m. S.E. The town was formerly subject to malaria. Pop. (1951) 38,224.

**Grossmith, GEORGE** (1847-1912). British actor and entertainer, born Dec. 9, 1847. He was associated with his father as reporter at the Bow Street police court. In 1870 he became an entertainer, and in 1877 began his career as actor and singer in Gilbert and Sullivan opera by appearing in *The Sorcerer* at the Opéra Comique, afterwards taking a leading part in eight more of these pieces at The Savoy. In 1889 he resumed his old career as entertainer, achieving much success at the piano in London, the provinces, and the U.S.A. With his brother Weedon (*v.i.*) he wrote the celebrated *Diary of a Nobody*. He died at Folkestone, March 1, 1912.

His son, also George (1874-1935), went on the stage at 18, in Gilbert's *Haste to the Wedding*, 1892. After playing in *The Shop Girl*, at the Gaiety, London, 1894, he appeared there in popular pieces until 1913. He entered management with Laurillard, with whom in 1919 he opened the Winter Garden Theatre, and was managing director of Drury Lane Theatre, 1931-32. He made films wrote the song *Yip-i-addy* and was its original singer, in *Our Miss Gibbs*, 1909, and in 1933 published his reminiscences, entitled *G. G.* He died June 7, 1935.

**Grossmith, WEEDON** (1853-1919). British artist and actor, brother of George Grossmith the elder. He studied in the R.A. schools and exhibited at the R.A. and Grosvenor Gallery. In 1885 he appeared on the stage at Liverpool, and he made his first



*Geo Grossmith*

appearance in London at The Gaiety in 1887. In 1891 he produced and acted in *A Pantomime Rehearsal*, which ran for two years; and maintained his success, which culminated in his own play, *The Night of the Party*, 1901. His last appearance was in *The Misleading Lady* at The Playhouse, 1914. With his brother he wrote for Punch, and himself illustrated, *The Diary of a Nobody*, 1892, repr. with memoir by B. W. Findon, 1920, and in several later edns.; and in 1913 published his reminiscences, *From Studio to Stage*. He died June 14, 1919.

**Grossulariaceae.** Family of (often) spiny shrubs. They are natives of the N. temperate regions and the Andes, gooseberry and currant being well-known examples. They have alternate leaves, and tubular or bell-shaped flowers, the calyx being the conspicuous part owing to the minute size of the petals. The fruit is a berry filled with juicy pulp surrounding the seeds. These shrubs are included in the Saxifragaceae. See Currant; Gooseberry.

**Grossularite.** A calcium-aluminum member of the garnet group of minerals, calcium-alu-



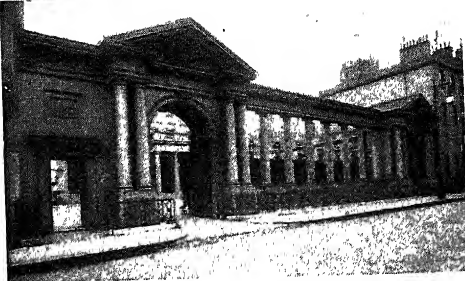
minium silicate ( $\text{Ca}_3\text{Al}_2(\text{SiO}_4)_3$ ), often containing subordinate iron. Grossularite is typical of the metamorphosed, impure calcareous rocks, and is common near intruded igneous rocks and in certain crystalline schists. See Garnet.

**Gross-Venediger.** Mt. mass of the Noric Alps, in the Hohe Tauern, on the borders of Tirol and Salzburg. It lies between the Gross Glockner and the Drei Herrn Spitze, and reaches an alt. of 12,010 ft. The Klein-Venediger, adjoining, attains 11,420 ft.

**Grosvenor.** Name of a family that holds three British peerages. The earliest Grosvenors were found in Cheshire in the 12th century. One of them who lived at Eaton, near Chester, was made a baronet in 1622, and was the ancestor of Sir Richard Grosvenor, made Earl Grosvenor in 1784. The earl's descendants became marquesses and then dukes of Westminster. The second peerage is the barony of Ebury, conferred in 1857 on Lord Robert Grosvenor, a son of the 1st marquess of Westminster. The third, the barony of Stalbridge, was bestowed in 1886 on Lord Richard Grosvenor, a son of the 2nd marquess. He was chief Liberal whip 1880-85, and for many years chairman of the L.N.W.R. *Prom. Grove-ner.* See Westminster, Duke of.

**Grosvenor Gallery.** London art gallery, founded in Bond Street in 1877 by Sir Coutts Lindsay (1824-1913), a painter of talent. The object of the gallery was the annual exhibition (by invitation) of pictures by artists who were supposed, rightly or wrongly, not to enjoy the favour of the R.A., and the type of pictures exhibited incurred some ridicule, expressed by W. S. Gilbert in *Patience* (1881) when he sang of "the greenery-gallery, Grosvenor Gallery, foot-in-the-grave young man." During the 1880s it became the centre of the aesthetic movement, famous exhibitors including Burne-Jones and Whistler.

**Grosvenor House.** London hotel in Park Lane, built on the site of the former home of the duke of Westminster. The original mansion on the S. side of Upper



Grosvenor House. London. Entrance to the former mansion, demolished 1928. Top, the new Grosvenor House



Weedon Grossmith,  
British actor  
Russell

Grosvenor St. was built for the duke of Gloucester, brother of George III. Its west wing contained a famous collection of pictures. Bought by Lord Leverhulme in 1924, the house was demolished in 1928, large blocks comprising service flats and shops being erected on the site.

**Grosvenor Square.** One of the famous squares of London. It is approached from Park Lane by Upper Brook St. and Upper Grosvenor St., Mayfair. About six acres in area, it was laid out by William Kent for Sir Richard Grosvenor (d. 1732) in 1695, and completed in 1725. The central gardens occupy the site of Oliver's Mount (whence Mount St.), a redoubt thrown up by the citizens in 1643 on the approach of Charles I after Edgehill.

Since the middle of the 18th century a fashionable quarter, the square was not lighted by gas until 1839. One of its early residents was the 4th earl of Chesterfield, at whose house Dr. Johnson was kept waiting in an anteroom. At No. 22 William Beckford entertained Nelson; at No. 23 the 12th earl of Derby was married to Elizabeth Farren the actress; at No. 6 Joseph Neeld, M.P., formed his collection of pictures. No. 39 (now 44) was a meeting place of the Cato Street conspirators. Lord Chancellor Hardwicke, Rockingham, Lord North, Wilkes, Stratford de Redcliffe, Bulwer Lytton, the philanthropic 7th earl of Shaftesbury, Pusey, and J. Pierpont Morgan were among other notable residents.

Towards the end of 1942 buildings in the square were taken over by the headquarters staffs of U.S. forces of the Second Great War. A year later nearly every house was occupied by naval, military, or air force personnel, the property being "lease-lent" to the U.S. government. The U.S. Office of War Information was also here for a short time. The square was therefore chosen as the site for the British national memorial to the war-time president of the U.S., F. D. Roosevelt, unveiled by his widow, April 12, 1948, and entirely subscribed for in small sums by the British public. The selected design, in which a garden enshrines an upright sculptured figure of the president by W. Reid Dick, was the subject of some controversy, one view being that, because Roosevelt throughout his presidency had been a cripple from infantile paralysis, he should not be represented as a standing figure.

**Grote, GEORGE** (1794–1871). British historian. Born at Beckenham, Kent, Nov. 17, 1794, and educated at Charterhouse,



*G. Grote*

After S. P. Denning

at 16 he entered his father's bank. He read widely in the classics and economics and philosophy. In addition to working at the bank for over 30 years, Grote also entered politics, becoming M.P. for the City of London in 1832, and was interested in the promotion of the university of London. Among his friends were the Mills, father and son, Brougham, and Ricardo. In 1843 he retired from the bank and devoted his leisure to the completion of his *History of Greece*. Though written as a vindication of democracy, the history, completed 1856, remains a monument of research and sound historical judgement, enriched by passages of great eloquence. Among other books by Grote are one on Plato and the other companions of Socrates, 1865, and another (unfinished) on Aristotle, 1872. Grote died June 18, 1871, and was buried in Westminster Abbey.

**Grotefend, GEORG FRIEDRICH** (1775–1853). German archaeologist. Born at Münden, Hanover, June 9, 1775, he became successively professor at Göttingen, 1797, Frankfurt, 1803, and Hanover, 1821. He was chiefly known as a classical philologist until he won fame by his contribution to the decipherment of the Babylonian cuneiform inscriptions. He died Dec. 15, 1853.

**Grotesque.** Ancient form of decorative painting or sculpture, in which nature was distorted, parodied, or exaggerated. Thus, in one variety, human and animal forms were combined in fantastic



Grotesque creature worked into the architectural ornament of Senlis Cathedral, France

By courtesy of Macmillan & Co.

fashion and interwoven with flowers and foliage, partly to tone down what might otherwise have been merely repulsive. The idea did not necessarily imply ugliness, but rather something bizarre, with a touch of the absurd and incongruous, in which sense the Romans often introduced it into the decorations of their buildings. The word is French, from Ital. *grottesca*, curious painted work found in grottoes. See Dance of Death.

**Groth, KLAUS** (1819–99). German poet. Born at Heide, Holstein, April 24, 1819, he was the first writer of importance to use Low German as a literary medium. He achieved fame with *Quickborn*, 1852, poems of Dithmarschen life. In 1858 he was appointed lecturer in German at Kiel university, and professor, 1866. He died at Kiel, June 2, 1899.

**Grotius, HUGO** (1583–1645). Latinised name of the Dutch jurist Hugo van Groot. Born at Delft,



*H. de groot*

After M. J. Mirevelt

April 10, 1583, son of a lawyer, of a branch of the French noble family de Cornets, which took the name of Groot, he showed extraordinary intellectual abilities and as a boy acquired a wide knowledge of the classics. Having studied at Leyden and in France, he became a practising lawyer, but found time to write Latin verses and dramas.

In 1603 he was appointed historiographer of the United Provinces; other public positions were also given to him; but his share in the politics of the time led to his fall. Of tolerant spirit, he wished to mitigate the fierce hostility between the religious parties in Holland, but in this he failed. Regarding the Remonstrants (*q.v.*) as less fanatical than their opponents, he joined and assisted Barneveldt in stating their case. In July, 1618, Maurice of Orange made a sudden move against Barneveldt, and Grotius in 1619 was sentenced to life imprisonment. In 1620 he escaped from Loevenstein, thanks to the wit and devotion of his wife, in a chest used to send books to him in prison; reaching Paris, he lived for some time in poverty in France. Later, having entered the Swedish service in 1634 he was made ambassador to France. He died at Rostock, Aug. 28, 1645.

In exile Grotius wrote his monumental work, *De jure belli ac pacis*, published in 1625 in Paris. He wrote other works of the kind, bringing to his task an immense fund of learning. He also wrote on theological questions, and his *Annals of the Netherlands* is the best contemporary account of the revolt against Spain.

His fame, however, rests upon his *De jure*, the foundation of modern international law. It deals not only with peace and war, as the title suggests, but with the powers and duties of states. The main idea which we owe to him is that there is a foundation in morality for states and a test in morality for their activities.

Grotius visited England and was intimate with the greatest scholars of his day, Casaubon and his master, Scaliger, among them. More than 3,000 of his letters have been published. See *International Law*; consult also *Life and Works*. W. S. M. Knight, 1925.

**Grotius Medal.** Award for services to the cause of peace, instituted 1925 on the 300th anniversary of the publication of Grotius's *De jure belli ac pacis* by the Dutch league of nations society. There is a gold and a bronze medal. Recipients of the gold medal include Briand, 1926; Kellogg, 1929; Lord R. Cecil (Lord Cecil of Chelwood) and Nansen, 1930; W. S. Churchill, 1949.

**Grotius Society.** British learned society founded 1915 to discuss problems of public and private international law. Foreign lawyers are admitted as honorary and corresponding members. The headquarters are at 2, King's Bench Walk, London, E.C.4.

**Grottaferrata.** Town of Italy, in the prov. of Rome. It is 13 m. S.E. of Rome by electric rly. A Greek monastery was founded here by Nilus in 1004. The 11th-century church, rebuilt in 1754 and restored in 1902, has frescoes by Domenichino. Pop. (1951) 7,987.

**Grotto** (Fr. *grotte*; Lat. *crypta*). Cave or recess in the earth, particularly one made or enlarged artificially for use as a shrine or retreat.

On July 25, the festival of S. James the Great, it was formerly the custom of the faithful to fasten a shell in hat or coat and make pilgrimage to the shrine at Compostella to which, according to tradition, his body was translated. Shell grottos with a figure of the saint were set up by the wayside, where those too poor to make pilgrimage could make their offerings to commemorate the day. Children

in many countries preserve the custom, though not its purpose, by erecting little decorative shrines of oyster shells and soliciting money with the cry, Remember the grotto.

One of many notable grottos is the Dog's grotto, *Grotta del Cane*, by the lake of Agnano, near Naples. Over the floor of this carbonic acid gas rises to a height of some 18 ins., stupefying dogs taken into the grotto. There is a famous Blue Grotto at Capri (*q.v.*).

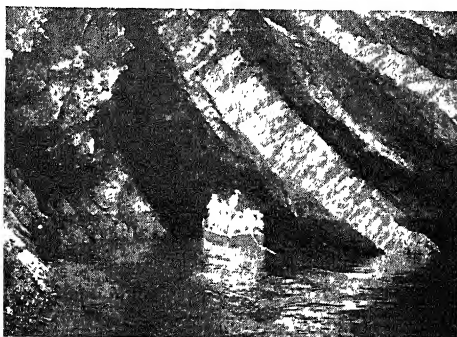
**Grouchy, EMMANUEL, MARQUIS DE** (1766-1847). French soldier. Born in Seine-et-Oise, Sept. 5,



Emmanuel, Marquis de Grouchy, French soldier

1766, he joined the Revolutionaries, notwithstanding his aristocratic birth, and assisted in suppressing the royalist rising in La Vendée. He fought in Italy in 1798, and, becoming one of Napoleon's most trusted leaders, took part in the battles of Hohenlinden, Friedland, and Wagram. He was in the Russian campaign of 1812, and did good service in the retreat after Leipzig. His failure to appear with his division against the British on the field of Waterloo was said by Napoleon to have lost the battle — although the emperor had ordered Grouchy to watch the Prussians. After Waterloo he was proscribed and took refuge in the U.S.A., but was permitted to return in 1819, and in 1830 received his old style of marshal. He died at St. Étienne, May 29, 1847.

**Ground Annual.** In Scots law, a payment charged upon certain lands, something like the English ground rent. It is paid on land once the property of the Church, such being the feu duties paid to the lords of erection, the successors of those who received the lands at the Reformation. It is also used for the annual payment made some-



Grotto at Morgat, Brittany: a natural cavern in the rocks only approachable from the sea

times by builders for the use of land for building purposes.

**Ground Bass** OR **BASSO OSTINATO**. Short musical phrase repeated many times with varied treatment. It is usually in the bass part, but is sometimes transferred to an upper part. The ground bass has been used from the 17th century to the present day, and fine examples occur in Bach's well-known *Passacaglia*; Purcell's *Chaconne* in *The Fairy Queen* and many of his vocal works; Handel's choruses *Envy*, *Eldest Born of Hell* (*Saul*), and *To Song and Dance* (*Samson*); and in the *St. Paul's Suite*, by Gustav Holst.

**Ground Gunner.** Designation, or trade, established in the R.A.F. in 1939 to man the light A.A. artillery defending airfields at home and overseas. Ground gunners were in constant action on coastal fighter aerodromes during the battle of Britain. When the R.A.F. Regiment was formed in 1942, they were incorporated into its A.A. squadrons.

**Ground Ice.** Name given to the natural phenomenon more usually called *Anchor Ice* (*q.v.*).

**Ground Ivy** (*Nepeta hederacea*). Perennial prostrate herb of the family Labiatae. It is a native of

Europe and N. and W. Asia. The trailing stems are 2 ft. or more in length, with opposite, kidney-shaped leaves, round-toothed at the edges. The tubular, blue-purple flowers are produced in whorls of from three to six at the base of the leaf-stalks. This plant is no relation to the ivy (*Hedera helix*). Bitter and aromatic, it was formerly employed in brewing, and a tea was made from its leaves.



Ground Ivy. Foliage and bluish flowers

**Ground Nut, PEA-NUT, MON-KEY NUT, OR EARTH-NUT** (*Arachis hypogaea*). An annual herb of the family Leguminosae. It is a native of S. America and the W. Indies and is cultivated in most trop. latitudes. The leaves have four oval leaflets, and the pea-like flowers are yellow. After pollination the flower-stalk lengthens and curves to the ground, in which it buries the incipient fruit, which there develops into the yellowish wrinkled pods which contain two seeds.



Ground Nut, showing lengthened flowerstalks and buried fruits

**Ground Nut Scheme.** Scheme launched in 1946 by the British govt. for the large-scale production of ground nuts to help to meet world shortage of edible oils and fats, following a suggestion from the United Africa Co. (a subsidiary of Unilever) and a favourable report on the suitability of certain districts in British E. Africa. A white paper issued in Feb., 1947, recommended a five-year development plan for 107 areas of 30,000 acres each, which, it was estimated, would yield by 1950-51 some 600,000 tons of ground nuts, at just over £14 a ton (current market price being £32).

The United Africa Co. managed the initial stage; in 1948 the newly-created overseas food corporation took over. The corporation's first annual report showed liabilities of over £23 million; the cost of clearing the bush had been nearly £40 an acre (instead of an est. £3 17s. 4d.); severe drought had limited the 1947-48 crop to 2,150 tons of unshelled nuts and 800 tons of sunflower seed. In 1950 those members of the corporation who had reported favourably in 1946 were dismissed, and the chairman resigned. The harvest of 1949-50 was smaller, and in 1951 the scheme as such was abandoned, and the £36,500,000 which had been spent was written off. E. Africa Industries, Ltd., owned jointly by the Colonial Development Corporation (*q.v.*) and the Kenya govt., was set up to manage the ground nut properties; in 1953 Unilever became substantial shareholders in this concern.

**Groundsel** (*Senecio vulgaris*). Annual herb of the family Compositae. A native of Europe and N. Africa, it has succulent stems 6 ins.-1 ft. in height, with slender leaves cut into irregular lobes

and coarsely toothed. The drooping flower-heads are yellow, succeeded by a small globe of fluffy, silky hairs which carry the fruits everywhere.

**Ground Speed.** The speed of an aeroplane relative to the earth's surface, as distinct from its speed through the air. If an aeroplane is flying at 200 m.p.h. air speed against a steady wind of 20 m.p.h., its ground speed will be 180 m.p.h. See *Airspeed*.

**Ground Squirrel** (*Tamias*). Alternative and popular name for the chipmunk (*q.v.*).

**Group.** A formation of the R.A.F., consisting of two or more wings, and itself a subdivision of an allied or R.A.F. command. A group is normally commanded by an air vice-marshal or air commodore. A famous example in the Second Great War was No. 11 (fighter) group, responsible for the defence of London and S.E. England in 1940, and forming part of Fighter Command.

**Group Captain.** A Royal Air Force officer, corresponding in rank to a captain in the Royal Navy or a colonel in the army. Four rings, worn on the cuff or epaulette, are the insignia of the rank, which is also the lowest entitling the holder to wear gold braid on the peak of the cap. There is a similar rank in the W.R.A.F. (group officer in the former W.A.A.F.).

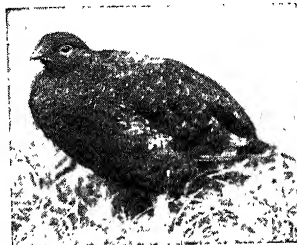
**Groups, THEORY OF.** Modern development of higher algebra. It deals with the transformation of algebraic forms. The theory of groups of substitutions was suggested by E. Galois, a French mathematician (1811-32); a new theory of groups of substitution was due to the Scandinavian mathematician Sophus Lie, whose investigations on this subject were published 1888-93. Consult *Theory of Groups of Finite Order*, W. Burnside, 2nd ed. 1911.

**Grouse.** The name applied by zoologists to all members of the family of game birds known as Tetraonidae, which includes more than 30 species; but popularly used in a more restricted sense. Four species of grouse occur in the N. of Great Britain. The ptarmi-

gan, which turns white in winter, is found only in the wilder districts of Scotland; the blackcock, the female of which is known as the grey hen, is much larger, and is said still to occur in S.W. England as well as in Scotland; the capercaillie, largest of all, became extinct in Great Britain in the 18th century, but was reintroduced in 1837 and is now fairly plentiful in Angus, Perth, and Stirling; the red grouse, or moor cock, is by far the most plentiful, and the bird commonly implied when speaking of grouse.

The red grouse (*Lagopus scoticus*), which measures about 15 ins. in length and weighs 20-30 oz., is found only in the British Isles, and is one of the few species exclusively British. On the Continent and in Asia and N. America it is represented by a similar willow grouse, and some authorities regard the two as varieties of the same species. But the willow grouse turns white in winter, which the red grouse never does; its note is somewhat different; and its food and habits are not the same. Anatomically the two birds are almost identical.

Grouse are found on the moors throughout Scotland and the surrounding islands, except the Shetland islands; in the northern counties of England, in some parts of Wales, and thinly throughout Ireland. The birds nest in March on the ground, usually in the shelter of a tuft of heather or other herbage, and the number of eggs varies from six to fourteen. In



Grouse. The red grouse, one of the few species exclusively British  
W. S. Berridge, F.Z.S.

colour they are usually reddish-yellow, blotched with brown, but they vary greatly. Unlike many game birds, the grouse is monogamous. The food consists mainly of the young shoots of the heather, but grubs and insects are also eaten.

Sometimes, but rarely, plumage is black; in some districts it is not uncommonly spotted with white on the breast and underparts. The colour varies after the moults. The hen moults in spring and autumn, the cock in autumn and winter. See *Blackcock*; *Egg*; *Ptarmigan*.

**GROUSE SHOOTING.** The two legitimate methods of killing grouse are by shooting them over dogs, and driving the birds to the guns with the aid of beaters. The

advantages of the latter method, which is now more in favour, are that the guns can be stationed at fixed positions, usually in well-placed butts, which conceal the sportsmen, and that the fact of the birds being driven gives a greater chance of the older and stronger birds being killed first. Though never reared and fed artificially like the pheasant, grouse are carefully preserved on the moors and need considerable attention, as wet seasons, overcrowding, and epidemic diseases are very apt to reduce their numbers. The shooting season in Great Britain for grouse extends from Aug. 12 to Dec. 10. See *Sporting Gun*.

**Grove, Sir George** (1820–1900). British writer on music. Born at Clapham, Aug. 13, 1820, he was



Sir George Grove,  
British writer

educated as a civil engineer. His main interests, however, were in music, and in 1883 he became the first director of the new Royal College of Music and was knighted. He was editor of *Macmillan's Magazine*, 1868–83, and put together the first edition of the *Dictionary of Music and Musicians*, of which several revised editions have appeared. He published *Beethoven and His Nine Symphonies*, 1896. One-time secretary of the Society of Arts, he died May 28, 1900.

**Grove, Sir William Robert** (1811–1896). A British lawyer and scientist. Born at Swansea, July 11, 1811, he was called to the bar in 1835 and became a judge of the high court 1873. He made a number of scientific discoveries and invented the Grove cell, while his theoretical work in the transmission of electric currents did much to make possible electric lighting. A fellow of the Royal Society in 1840, he was vice-president of the Royal Institution in 1844. In 1846 he published *The Correlation of Physical Forces*. Knighted 1871, he died Aug. 1, 1896.

**Grove Cell.** Primary cell comprising two metals and two liquids named after Sir W. R. Grove (*v.s.*). A porous pot containing a platinum plate and strong nitric acid is situated within an outer glass vessel and surrounded with dilute sulphuric acid. The other electrode is a zinc roll; this is attacked by the sulphuric acid and the hydrogen liberated passes

into the porous pot and reduces the nitric acid to nitrous and forms water. The chief disadvantage of the cell is that disagreeable and irritating nitrous fumes are given off. The Bunsen cell is similar to the Grove but substitutes a carbon plate for the platinum electrode.

**Growth.** Gradual increase in size. The term is used chiefly in connexion with living organisms. In the simplest of these growth involves only the enlargement of the single cell. In more complicated organisms the process results from the enlargement and multiplication of cells to a definite plan. Answering to some unknown control, cell groups, each according to its kind, take up their stations in an organism. Nerve cell calls to nerve cell to form the nervous system; liver cell to liver cell to form the liver structure. An equally mysterious law causes cells to arrange themselves in the future animal in preparation for a function not yet established. Thus, within the brain the centre of hearing is forming while on the exterior of the animal ears are simultaneously in preparation. In higher plants growth is initiated by the meristems at the apices of stems and roots and may be continued by the activity of cambium which occur in their thickness.

Different systems mature at different rates; *e.g.* the eye is already declining in capacity before the power of the mind has reached its zenith. Often the different parts of an organism grow at various rates. If the antlers of a stag grow faster than the stag, there must come a point at which the antlers are too big for the animal to manage. In practice it has been found that often the growth rate of one part of an animal is related to that of the whole animal by a fairly simple mathematical statement. The principle has been discussed by J. S. Huxley in *Problems of Relative Growth* (1932).

Growth can be stimulated by the agency of chemical substances, notably the anterior pituitary hormone and the active substance of the plant colchicum. Such "auxins" act on both animal and vegetable organisms.

From the moment of conception an animal is under sentence of death, the rate of subdivision and growth of the embryonic cells slowing down even before birth. The cause of cessation of growth is unknown. Some unrecognized factor puts the mechanism of

growth into reverse and the structure moves towards disintegration. Mechanism and vitalism are terms describing two rival schools of thought about growth; mechanism regarding the animal as a machine conditioned by circumstance, vitalism holding that it is imbued with and driven by some life force.

In medicine a malignant growth is a tumour such as cancer. Any abnormal increase in any part of the body may be called a growth. In crystallography a crystal is said to grow, while retaining its proportions. See *Cancer*; *Cell*; *Embryology*; *Physiology*; *Plant*.

**Groyne.** Projection built out to sea to obstruct the continuous drift of shingle or sand. On sea coasts where tidal currents prevail, littoral drift occurs, *i.e.* a gradual travel of shingle or sand along the shore, with usually a preponderating tendency in one direction. This may result in a give-and-take effect on straight stretches, or according to the configuration of the coast-line and other influencing factors, it may result in certain localities being denuded of their share of detritus and rendered more liable to erosion by the sea. To check this action groynes are projected from the shore, generally down to about low-water mark, against which detritus such as shingle or sand heaps itself on one side. Groynes are usually constructed of heavy timber planks bolted to and supported by driven piles and raking struts for resisting the pressure of the heaped-up mass. Sometimes they are built of masonry.

**Grozny.** Town of the R.S.F.S.R., capital of a region of the same name. The region was formed in 1944 from most of what had previously been the Chechen-Ingush A.S.S.R.; its chief economic importance is its oilfield. Area 12,700 sq. m.; pop. (est.) 600,000.

The town of Grozny is situated on the Zunzha river and on the rly. connecting Makhach-Kala with Rostov, the Caucasus mts. being immediately S. It is the centre of rich oil and naphtha areas, and a station on the oil pipeline from the Caspian port of Makhach-Kala to the Armavir refineries. Another pipe-line runs from Grozny to Tuapse on the Black Sea. The pop. has grown rapidly since the opening up of the oil areas, and in 1939 was 172,468. German armies in their drive for the Caucasian oilfields during the Second Great War approached in Oct., 1942, within a few miles of



Grozny, but were then halted. On the ground that they collaborated with the enemy, the Chechan and Ingush peoples were transported to other parts of the U.S.S.R.

**Grubber.** Term loosely applied to various forms of cultivator. By it the ground is deeply stirred, without being turned over as it is by ploughing. *See* Cultivator; Hoe.

**Grub Street.** Old name of a London thoroughfare in Cripplegate (*q.v.*), E.C., running N.E. from Fore Street to Chiswell Street, and known since 1830 as Milton Street. Described by Stow as having been inhabited by bowyers, fletchers, and bow-string makers, and satirised by Pope and Swift as the home of the poorest and most helpless of literary drudges—whence the application of its name to writers and literary efforts of a mean character—the thoroughfare was destroyed by German bombs in the Second Great War. John Foxe, the martyrologist, once lived in Grub Street.

**Grudziadz.** This is the Polish form of the name of the town called in German Graudenz (*q.v.*).

**Grün, ANASTASIUS.** Name taken by the Austrian poet Anton Alexander, Count von Auersperg (*q.v.*).

**Grünberg** (Pol. Zielona Gora). A town of Silesia, since 1945 under Polish administration. It is 35 miles by rly. N.W. of Glogau. It had textile industries and lignite mines, made machinery, and did a large wine trade, German champagne being made from the yield of the vineyards in the district. Pop., pre-war, 25,543.

**Grundtvig, NIKOLAI FREDERIK SEVERIN** (1783–1872). A Danish theologian, educationist, and poet.

Born Sept. 8, 1783, the son of the pastor of Udby, Zealand, he was educated in Copenhagen. In 1821 he was made pastor of Praestrø in Zealand and in 1822 chaplain of S.



Nikolai Frederik Grundtvig, Danish theologian  
After C. A. Jensen

Saviour's Church, Copenhagen. In 1825, in answer to Clausen, Grundtvig wrote his famous protest against the rationalistic tendency of the day in The Church's Reply. Clausen retaliating by exposing Grundtvig's unorthodoxy, the latter was deprived of his chaplaincy in 1826. In 1839 he returned to clerical work, and in 1861 became bishop. He died Sept. 2, 1872.

He wrote Northern Mythology, 1808; A Summary of Universal History, 1812; Roskilda Rhymes and Roskilda Saga, historical poems, 1814; Songs, 1815; Northern Verses, 1838; and A Handbook of Universal History, 1833–42. Grundtvig was famous as an educational reformer; his system of continuing the work of the elementary schools (Folkshögskola) in high schools (Folkshögskola) has borne wonderful fruit.

**Grundy, Mrs.** In Great Britain, the personification of conventional respectability. The name is taken from Thomas Morton's comedy, Speed the Plough (1798), in which one of the characters frequently refers to Mrs. Grundy—"What will Mrs. Grundy say?"—as the embodiment of the social proprieties.

**Grus** (Lat., crane). Southern constellation, named by Dirck Keyser. It is just south of Piscis Australis.

**Gruyère, LA.** District of Switzerland, in the canton of Fribourg. A pastoral region, it lies in the Saane valley and is celebrated for its cheese. The inhabitants are mostly French-speaking and Roman Catholic. The chief town is Bulle with a 13th century castle, but the historic capital is Gruyères, standing on a hill at an alt. of 2,713 ft., with a fine old castle of the counts of Gruyères, who became extinct in the 16th century; it is restored and contains frescoes and old weapons.

**Gruyère Cheese.** The most famous Swiss cheese; now made also in the Jura and in Italy. The German name is Emmenthaler. It is a hard cheese characterised by nut-shaped holes, due to gases formed in its manufacture. The curd is cooked in copper vessels, and pressed in adaptable moulds. Its excellence depends on the slowness with which it is matured. The popular belief that it must be made of goats' milk is unfounded.

**Guacharo** OR OIL BIRD (*Steatornis caripensis*). A remarkable bird, native of the N. part of S. America, related to the nightjars. The size of a crow, a feeder on hard nuts and fruits, it is entirely nocturnal, sleeping during the day in dark caverns. Little is definitely known about the nesting of the birds, but the young are extensively used as a food by the S. American Indians, and also as a source of oil. It is brownish grey in

general colour, and leaves its breeding and sleeping caverns at night with a loud clicking note. These peculiar birds, which have become objects of great interest to naturalists on account of their nocturnal methods of feeding, are found in Trinidad, Venezuela, Ecuador, Peru, and Colombia.

**Guaco.** Name given by S. American Indians to several plants, but confined by naturalists to a climbing Composite plant of the order Eupatoriaceae. The plant is remarkable for its supposed property of making anyone who eats its leaves immune from snake bites.

**Guadalajara.** Prov. of Central Spain. It is bounded N. by the prov. of Soria, S. by Cuenca, E. by Saragossa and Teruel, and W. by Madrid. Mountainous in the N. and E., its highest elevations rise nearly 7,000 ft. in the Guadarrama range on the N. frontier; elsewhere it is an undulating plateau. The prov., which is served by the Madrid-Saragossa rly., is drained by the Tagus and its tributaries, the Tajuna, Jarama, Henares, and Guadaleja. Silver and salt are worked, and iron and lead exist; but the chief industries are sheep and goat rearing and agriculture. Olive oil, wine, silk, flax, and saffron are produced. Area 4,709 sq. m. Pop. (1950) 203,278.

In the civil war, Nationalist troops launched an offensive from Sigüenza S.W. towards Guadalajara and Madrid on March 10, 1937. The main force was a mechanised Italian column, which suffered a reverse on the 14th and retreated to Brihuega, that town being captured by Republican troops on the 18th. The retreating Italians were attacked by aircraft and routed with heavy loss.

**Guadalajara.** Town of Spain, capital of the prov. of Guadalajara. It stands on the left bank of the Henares, at an alt. of over 2,000 ft., 33 m. E.N.E. of Madrid on the rly. to Saragossa. The chief buildings are two 15th century palaces, and the old Mendoza palace, all dilapidated; the church of San Francisco, with a mausoleum, or Pantheon, in which many of the Mendoza family lie buried; and a 16th century town hall. There are besides a museum, a library, a school for military engineering, a few quaint churches, and a military aerodrome. Woollen fabrics, soap and bricks are manufactured.



Guacharo. Specimen of the Trinidad species

Evidences of Roman activity include the foundations of a fine stone bridge and of the aqueduct across the river. The Roman and Visigothic Arriaca or Caraca, its present name is derived from the Moorish Wad-al-hajarah, or Valley of Stones. Captured by the Moors in 714, the town passed to Castile in 1081. Pop. (1950) 19,131.

**Guadalajara.** Second city of Mexico and capital of the state of Jalisco. Situated near the Rio Grande de Santiago, it stands at 5,095 ft. above sea level, 280 m. W.N.W. of Mexico City by rly. Another rly. and excellent roads connect it with the U.S. border. The city is planned on modern lines. It is the see of a bishop, its cathedral, completed 1618, being one of the most magnificent ecclesiastical structures in the country and contains a celebrated painting by Murillo. Other buildings are the university, the bishop's palace, the government building, a public library containing nearly 30,000 volumes, an academy of fine arts, and several educational institutions.

Trade in the agricultural produce of the district is carried on, and the city has steel, iron, and glass industries, besides manufactures of cottons, woollens, flour, leather, and art pottery. It has suffered from several earthquakes. In July, 1914, Guadalajara was surrendered to the Constitutionalists by the Federal forces. Pop. (1950) 377,928.

**Guadalaviar** (Arab. *Wad-el-abyad*, white river). River of E. Spain. It rises in two headstreams in the Sierra Albarracin and the Sierra de Gudar, uniting at Teruel, where it bends S. and then E.S.E., to discharge its waters into the Mediterranean 2 m. beyond Valencia, after a course of about 150 m. The right-hand stream, above Teruel, is known as the Al-fambra. The Guadalaviar is noted for its romantic scenery. Near its mouth the river is canalised, and forms part of the water supply of Valencia. There was heavy fighting along the river during the civil war, when Teruel was captured by Republican troops on Dec. 21, 1937.

**Guadalcanal.** Largest of the Solomon Islands. Discovered and named by the Spaniards in 1568, it came under British protection in 1893, and was made h.q. of the British Solomon Islands protectorate. In 1953 the h.q. of the Western Pacific high commission was moved from Fiji to Honiara on Guadalcanal. Area 2,500 sq. m.



Guadalajara, Mexico. The cathedral, built in the early 17th century, seen from the south-west:

The Japanese invaded Guadalcanal in Jan., 1942, with the object of establishing air and naval bases. On Aug. 7, U.S. marines landed under cover of a naval and aerial bombardment and secured a foothold. On the night of Aug. 8-9, a Japanese cruiser force sank four Allied cruisers in the channel between Guadalcanal and Tulagi and a counter-offensive was launched against the marines. Fighting was intensified in Oct. when fresh Japanese forces were landed. A naval victory, Nov. 13-16, helped to consolidate the American positions on the Solomons. The marines, reinforced by troops, maintained a steady offensive, and by Feb. 10, 1943, the Japanese garrison had been annihilated.

**Guadalquivir** (Arab. *Wad-al-kebir*, great river). River of S. Spain, the ancient Baetis. It rises by various headstreams in the mts. in the E. of the prov. of Jaen, and flows first N.E., then in a W. and S.W. direction, emptying into the Atlantic about 20 m. N. of Cadiz. Its length is 360 m. Second only to the Ebro in importance, it waters, with its tributaries, most of Andalusia. It flows with a full stream all the year round, being fed in summer by the melted snow from the mountains and by heavy rains in winter. The tide is perceptible as far as Seville, which can be reached by vessels up to 1,000 tons, a distance of 70 m., while Córdoba can be reached by small craft.

Principal tributaries are the Genil, Guadiana Menor, and the Guadajoz on the left bank, and

the Guadalimar and the Jandula on the right. Near its mouth the surrounding district, called Las Marismas, is a marsh, caused by the river overflowing its banks, and, before Seville is reached upstream, it branches, forming the islands of Isla Mayor and Isla Menor. The drainage area is computed at 2,900 sq. m.

**Guadalupe.** A river of Texas, U.S.A. Rising in Kerr co., it flows mainly S.E. for 250 m. to San Antonio Bay, being joined by the San Antonio river 20 m. from its mouth. For part of its course it is navigable by steamers.

**Guadalupe Hidalgo.** Village of Mexico, about 3 m. N. of Mexico City. It has a collegiate church, and a shrine dedicated to Our Lady of Guadalupe, saint of the country. By a treaty concluded here, Feb. 2, 1848, Mexico ceded New Mexico and Upper California to the U.S.A. and agreed to the Rio Grande as the boundary line.

**Guadarrama, SIERRA DE.** A mountain range of Central Spain. From the W. the mountains traverse the centre of the prov. of Avila and then mark the frontier between the provs. of Segovia and Soria on the N. and Madrid and Guadalajara on the S. They trend from S.W. to N.E., and divide the valleys of the Douro and Tagus. The loftiest point is the Pico de la Peñalara, with an alt. of 7,870 ft. Extensions on the S.W. are known as the Sierra de Gredos. There was inconclusive fighting in the mountains N. of Madrid on July 28, 1936, during the Spanish civil war; and Gen. Franco's forces suffered a reverse in the same

district on Aug. 25. Republican (Government) troops withdrew from their positions in this region during the encirclement of Madrid by the Nationalists in Oct.

**Guadeloupe.** Two islands of the Lesser Antilles, West Indies, formerly a colony, made in 1947 an overseas dept., of France. In the W. Atlantic, S. of Antigua and N. of Dominica, they are separated by a narrow strait called Rivière Salée. The large western island is Guadeloupe proper; the eastern is called Grande-terre. Five smaller islands are included in the dept. Total area, with dependencies, 688 sq. m. Guadeloupe proper is of volcanic origin, and a range of mts. forms its backbone from N. to S. Among the volcanoes are Soufrière (alt. 5,000 ft.), Les Deux Mamelles, and La Grosse Montagne. Grande-terre is of coralline formation, and nowhere exceeds an elevation of 500 ft.

There are no rivers of any importance—most of them dry up in summer, leaving only shallow pools. Forests of valuable timber abound, and mangroves flourish on the swampy coast. The soil is extremely fertile, the chief products being coffee, cacao, sugar, bananas, and rum. The climate, though hot, is not unhealthy, but the dept. is subject to destructive storms. The principal port is Pointe-à-Pitre (pop. 26,000), at the S. entrance to the Rivière Salée, and there are safe anchorages in the roads of Basse-terre and in the Bay of Mahault. The five dependencies are the islands of Marie Galante, Désirade, St. Martin, Les Saintes, and St. Barthélemy. The seat of the government is at Basse-terre, which is in Guadeloupe proper, and is a town of 12,000 inhabitants. Pop. 230,000.

Guadeloupe was discovered by Columbus in 1493. It was taken in 1635 by the French, who relinquished it to the British in 1759. It changed owners many times during the next 50 years, until it was ceded to France 1814.

**Guadiana.** River of S. Spain, the ancient Anas. It rises in headstreams in the provs. of Cuenca and Albacete, and flows, partly underground, generally in a W. direction, through the provs. of Ciudad Real and Badajoz. From the city of Badajoz (q.v.) it flows S.S.W., forming for nearly 40 m. the boundary between Badajoz and the Portuguese prov. of Alentejo. Continuing through Portuguese territory, it bends S. and S.S.E. along the frontier of

the Portuguese prov. of Algarve and the Spanish prov. of Huelva, to fall into the Atlantic between Vila Real de San Antonio in Portugal and Ayamonte in Spain. Its length, including its principal headstream the Zaccara, is about 500 m. The chief tributaries are the Jabalín, Cobres, Ardilla, Zujar, Ruecas, and Bullaque. It is navigable for only 40 m. from its mouth, which is nearly choked by shoals. At Mertola, the head of navigation, the river is spanned by a Roman bridge of 81 arches, built by Trajan. It drains an area of about 32,000 sq. m.

When Badajoz was captured by Gen. Franco's troops on Aug. 9, 1936, during the civil war, there was heavy fighting along the river.

**Guadix** (Arab. Wad Ash, water of life). City of Spain, in the prov. of Granada. It stands on the N. slope of the Sierra Nevada, a junction on the Granada-Almería rly. It has ancient walls and a ruined Moorish castle. Its 18th-century cathedral is built on the site of a mosque. There is trade in brandy, cotton-wool, flax, and cereals; manufactures include building materials, earthenware, hats. There are mineral springs and iron and copper mines in the vicinity. Once covered with water, the whole undulating district is intersected by gullies cut by the retiring floods. Pop. (1950) 30,088.

Guadix la Vieja, 5 m. to the N.W., the Roman Acci, is the traditional seat of the first Iberian bishopric (2nd century).

**Guaduas.** Town of Colombia, in the prov. of Cundinamarca. It stands near the river Magdalena, 45 m. N.W. of Bogotá. At an alt. of 3,300 ft., it is a centre of sugar, coffee, and fruit cultivation. There are large asphalt deposits near.

**Guaiaicol.** A colourless oily liquid, occurring in crystals, obtained by fractional distillation of wood-tar creosote, or synthetically. It has antiseptic properties.

**Guaicum.** Genus of tropical trees of the family Zygophyllaceae, of which the most important species is *Lignum vitae* (q.v.).

**Guajira.** See Goajira.

**Gualdo Tadino.** A town of Italy, in the prov. of Perugia. It stands on a spur of the Apennines, at an alt. of 1,750 ft., 22 m. by rly. N. of Foligno. A walled town, it has a cathedral; the town hall contains pictures by Nicolo Alunno. Earthenware and silk are made, and there is trade in millstones, cereals, and olive oil. In the neighbourhood are scanty remains of

the ancient Tadinum, where Narses defeated Totila the Ostrogoth in 552. Pop. (1951) 3,055.

**Guauguay.** Town of Argentina, in the prov. of Entre Ríos. It stands on the navigable river Guauguay, 8 m. by rly. N.E. of Puerto Ruiz. It has tanneries, flour mills, slaughter houses, and meat-curing and soap factories, and is the centre of a rich grain and pastoral region. There is rly. connexion with Buenos Aires. Pop. (est.) 26,000.

**Guauguaychú.** A town and river port of Argentina, in the prov. of Entre Ríos. It stands on the Guauguaychú, 10 m. from its entry into the Uruguay. It is on the Paraná-Concepción rly., carries on a brisk trade along the river, manufactures meat products, and has tanneries and refrigerating plant. Pop. (est.) 40,000.

**Guam.** Largest and southernmost of the Marianne islands in the Pacific Ocean, belonging to the U.S.A. About 130 m. S. of Saipan, it is 32 m. long, 4-10 m. broad; area about 225 sq. m. The climate is warm and healthy. Earthquakes, not often destructive, are common; typhoons sometimes cause serious damage. The island is low and of coral formation in the S., hilly in the N. Densely wooded and well watered, it yields coconuts, rice, citrus fruits, sugar, maize, coffee, and timber; copra is the chief export. Cattle and buffaloes are reared. Guam was ceded to the U.S.A. by Spain in 1898. The capital is Agaña, and the port of entry Piti.

The island was never strongly garrisoned, and the Japanese, having bombed it the day after they attacked Pearl Harbor, Dec. 8, 1941, landed without difficulty and captured the whole island in four days. U.S. forces established beach-heads on July 20, 1944, and reoccupied the island by Aug. 10. The towns suffered severe damage in the fighting. Guam was administered by the U.S. navy 1899-1949; in 1950 it was transferred to the Interior dept. of the U.S. gov't. Full citizenship was conferred on the inhabitants (who had been made U.S. "nationals" in 1940), and a biennially elected congress was set up. Pop. (1950) 59,498.

**Guan.** Group of game birds of genus *Penelope*. Found in S. America, they include about 15 species. Large birds, nearly related to the curassows, they usually have naked throats and wattles. They are found in the forests, and go in large flocks, except in the nesting

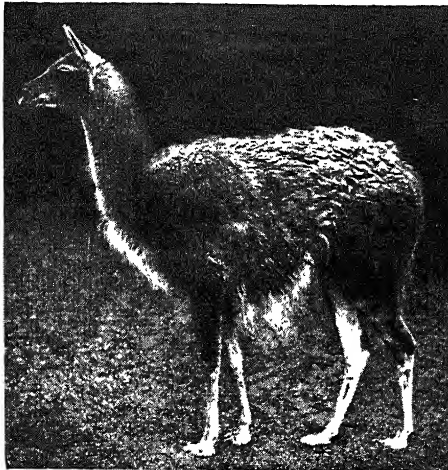
season. They vary considerably in colour from green to brown. Most are amenable to domestication.

**Guanabacoa.** Town of Cuba. Situated about 6 m. by rly. E. of Havana, of which it is a residential suburb, it has a theatre, a hospital, and medicinal springs. An old town, formerly occupied by Indians, it was chartered in 1743, and captured by the British in 1762. Pop. 19,000.

**Guanaco** OR **HUANACO** (*Lama huanaco*). Species of llama. Ranging from Peru to Patagonia, it is rather larger than the vicuña, a good specimen being rather more than 4 ft. high at the shoulder. Guanacos live in large herds in the mountains and are difficult to approach, though in captivity they are easily domesticated. The term llama is usually applied to a domesticated breed of this species. It has the curious habit of resorting to certain places at the approach of death, and the ground in these "cemeteries" is often white with its bones.

**Guanajuato.** Inland state of Mexico. Situated on the central plateau, at an alt. of about 6,000 ft., it is one of the most thickly populated states and has an area of 11,804 sq. m. Mountainous in the N., it is watered by the Lerma and its tributaries, and contains several lakes. Gold, silver, tin, lead, mercury, and copper are extensively worked. Stock-rearing and agriculture are important industries, and cotton and woollen goods, flour, beer, and spirits are manufactured. The state is served by the National rly. and connected by highway with Mexico City. Guanajuato is the capital. Pop. 1,046,490.

**Guanajuato** OR **SANTA FÉ DE GUANAJUATO.** City of Mexico. The capital of Guanajuato, 250 m. by rly. from Mexico City, it is situated 6,550 ft. above sea level, on both sides of the Cañada de Marfil, a narrow defile. A branch line to Silao connects it with the main National rly. Among the principal buildings are the Alhóndiga de Granaditas, built for a public grain store and now the prison, the cathedral, the mint, the government palace, a college, and superb theatre. The silver mines were the most valuable in the country, but increasing depth has made



Guanaco, the wild llama found in various parts of South America

them difficult to work. The chief manufactures are woollen and cotton goods, chemicals, soap, pottery, and flour. Guanajuato was founded in 1554. It suffered great damage in the war of independence, during which it was taken in 1810. Pop. 40,000.

**Guanare.** Town of Venezuela, capital of Portuguesa state. It stands near the river Guanarito, 50 m. S.E. of Trujillo. Founded in 1593 it is an important centre of a coffee, sugar, and cattle producing district. Pop. 14,000.

**Guanches.** Aboriginal people of the Canary Islands. Descended from a Libyan immigration into Teneriffe by sea in the dawn of history, they were subsequently affected by other arrivals, especially in Grand Canary. Early Mediterranean — perhaps Phoenician — traders brought some cultural elements of Egyptian origin, especially the practice of embalming. Their social institutions, polyandry, abandonment of the aged, separate paths for the sexes,

and their non-metallic technology (rough pottery, bone and shell ornaments, stone and wood implements) were determined by their insulation. Mastered by Spain in the 15th century, they remain the substratum of the Hispanified pop. of the archipelago.

**Guanidine.** An alkaline substance with a caustic taste which occurs in vetch seedlings and sugar beet. It was prepared originally in 1861 by Strecker by the oxidation of gua-

nine, and hence received the name guanidine. Guanidine, which is a poisonous substance, forms a series of crystalline salts with acids.

**Guanin** OR **GUANINE.** Substance first found in guano, 1845. It is an important constituent of such organs as the pancreas, spleen, liver, and testicles of animal's and germ cells of plants. It is also formed from the shells and outer coverings of minute crustaceans, and gives rise to the cells called iridocytes in the scales of sea trout and true salmon that give them their silvery appearance. The fish obtain guanin from the shellfish on which they feed, and since these are much more plentiful in the sea, the sea fish acquire a silvery appearance absent in the brown trout and other river fish. The silvering of the body of saltwater fish acts as a protection, making them almost invisible when viewed from the side.

**Guano** (Peruvian *huana*, dung). Name originally given to the accumulated excreta of birds found principally upon the shores and islands of the South American coast, chiefly Peru and Chile, and little frequented islands in the Pacific Ocean. The original deposits of land and sea birds have been much depleted by commercial demand, and artificial substitutes are largely employed. The principal ingredients of guano are phosphorus and ammonia.

**Guantánamo.** Town of Cuba. Situated in the S.E. of the island, it is about 10 m. from Guantánamo Bay, and is connected by road, rly., and air with Santiago, 40 m. to the W., and Caimaneria, its port, 12 m. to the S. Leased to the



Guanajuato. Market place in the capital city of the Mexican state

U.S.A. as a naval station in 1903, it has a large and safe harbour, and carries on a considerable export trade in sugar, coffee, and lumber, the products of the locality. Guantánamo was occupied by a British naval force in 1741, and was settled by French emigrants from Haiti about the beginning of the 19th century. Pop. 68,372.

**Guapay** OR RIO GRANDE. River of Bolivia, tributary to the Mamoré. Rising in the dept. of Cochabamba, it flows S.E. and then N.W., receiving the Piray and the Yapacani on its right or S. side. The mainhead stream of the Mamoré, it is often called the Rio Grande or Great River. Its length is about 550 m.

**Guaporé** OR ITÉNEX. River of Brazil. It rises in Matto Grosso, and flows N.W., joining the Mamoré. For part of its course it forms the boundary between Brazil and Bolivia. It is about 940 m. long, and navigable for small craft up to Matto Grosso. It gave its name to a territory constituted 1943, renamed Rondonia 1956.

**Guaqui.** Town of Bolivia, in La Paz dept. The terminus of the Guaqui-La Paz rly., it stands on Lake Titicaca near the mouth of the Desaguadero, and is the chief port on the Bolivian side of the lake, with steamer communication to Puno in Peru. Near are the world-famous pre-Inca ruins of Tiawanaco (*q.v.*).

**Guarana** (*Paullinia cupana*). A climbing shrub of the family Sapindaceae. It is a native of Brazil, and has alternate, compound leaves, tendrils, and small whitish flowers in sprays. The pear-shaped fruit is three-celled, each cell containing a single seed partly enveloped in an aril (like the mace of nutmeg). These seeds are dried and ground to a fine powder which, moistened and kneaded into a dough, is rolled into sticks 6-8 ins. long, used in making a beverage. The essential principle of guarana is identical with that of tea.

**Guaranda.** Town of Ecuador, the capital of Bolívar dept. On the river Llangama, it is reached from Cajabamba on the Guayaquil-Quito rly. by a branch road. It is the centre of production of cinchona bark, from which quinine is prepared, and exports cereals and timber. Pop. 12,000.

**Guarani** (Caraib, warrior). Term loosely applied to a group of S. American Indian tribes of allied speech, a sub-division of the Tupi language group. Formerly numerous, they were sedentary cultivators who lived in large palisaded

wooden villages; they ate their prisoners of war. The Bolivian tribes retain the long octagonal huts, roomy canoes, long bows and arrows, and body-paint of the early Caribs.

**Guarani, RUINS OF.** Locality in Argentina, near Posadas in the prov. of Misiones. They are reached by motor or launch. The ruins of San Ignacio show the remains of ancient Jesuit missions, consisting of four great squares, a cathedral, and a college, set in lush tropical vegetation.

**Guarantee** (O.F. *garantie*, warranty). Term of English law. It means a promise to be answerable for the debt, default, or miscarriage of another. Guarantee necessarily supposes three parties and two obligations: (1) the creditor or person with whom the principal obligation is entered into; (2) the principal debtor, or person who enters into an obligation with the creditor; and (3) the surety or guarantor, who enters into a secondary obligation with the creditor that the principal debtor shall perform his obligation.

The obligation guaranteed may be a mere debt, or it may be the performance of a contract, *e.g.* when someone guarantees that another shall do certain work in a certain way, or in a certain time. The common fidelity guarantee is merely a contract to guarantee the faithful carrying out of his contract by a servant, etc. A guarantee must, under the Statute of Frauds, be evidenced by writs signed by the guarantor. A guarantee is a contract requiring the utmost good faith. The creditor must disclose everything he knows which might affect the mind of the guarantor, *e.g.* if A is to guarantee the honesty of a servant of B's, and B knows, and does not tell A, who does not know, that the servant has previously been guilty of theft, the guarantee is bad. During the currency of the guarantee the creditor must not deal with the principal debtor behind the guarantor's back so as to make the guarantee more onerous. The Partnership Act, 1890, provides that a continuing guarantee given to a firm or to a third person in respect of the transactions of a firm is, in the absence of agreement to the contrary, revoked as to future transactions by any change in constitution of the firm, to or in respect of which the guarantee was given.

**Guarantee Association.** Society for guaranteeing persons against loss. In the U.K. the most usual kind is one which, in

return for annual payments, undertakes to make good any defalcations on the part of persons in positions of trust, *e.g.* a cashier. In the U.S.A. are many societies that guarantee titles to land, rents, trade debts, investments, etc.

**Guard.** Word used in several senses, generally with the idea of protection. In one sense the guard means soldiers on duty to protect the person or residence of the sovereign, or military headquarters. In London and Windsor mounting the guard and changing the guard are ceremonies of some interest. From guard comes the word guards to denote regiments of soldiers, although yeomen of the guard is an example of the older use of the word. See Guards; Sentinel.

**Guarda.** District of Portugal, in the prov. of Beira Alta. South of the river Douro, it is bounded on the E. by the Spanish prov. of Salamanca. The Serra da Estrela traverses the S. part of the district, which is well watered and contains several important towns. Guarda is the capital. Area 2,116 sq. m. Pop. (1950) 307,667.

**Guarda.** A city of Portugal, capital of Guarda district. It is the highest inhabited city in the country, standing at an alt. of 3,460 ft. on the N.E. slopes of the Serra da Estrela, 105 m. by rly. N.E. of Coimbra. Enclosed by ancient walls, it has a ruined castle, built as a "guard" against the Moors, hence the name. The stately cathedral dates from the 16th century, and there is a large sanatorium. Pop. (1950) 51,468.

**Guardafui, CAPE.** Most easterly portion of the African continent. It is in Somaliland, on the S. shore of the Gulf of Aden. A bold and commanding headland, it presents the appearance of a crouching lion when approached from the S. The surrounding country is rocky and barren, but several small coast villages are situated near the cape.

**Guardant.** In heraldry, used of a four-footed beast standing sideways, with its face turned to the spectator. If walking past Guardant in heraldry in profile it is passant; if looking backwards, it is described as regardant.

**Guardi, FRANCESCO** (1712-93). Venetian painter, born Oct. 5, 1712. He became a pupil of Canaletto. His master's rendering of architecture was firmer and more accurate, but Guardi was a better



colourist, and depicted atmospheric effects with truer feeling, and water with greater buoyancy. There are several good examples in the National Gallery, London. Guardian died Jan. 1, 1793.

**Guardian** (O.F. *garder*, to guard). In English law, person appointed by the father or by the court to look after the person of an infant. The father can appoint a guardian by his will, but cannot oust the mother, who will act with the father's nominee. A guardian can forbid his ward's marriage, control his education, and limit his pocket money, and generally takes the place of the father. If the ward is refractory the guardian can make him a ward of court by applying to the chancery division. A guardian *ad litem* is a person appointed by the court to represent an infant defendant. A guardian is not allowed to make a profit out of his office, and his duty is to see that the ward is brought up in a manner befitting his station in life. A guardian cannot interfere with the ward's religion, which must be that of his father until he is old enough to choose.

In England, guardians of the poor were men and women elected by the ratepayers to look after the poor. Boards of guardians were abolished in 1930, their functions being transferred to co. and co. bor. councils. See Poor Law.

**Guardian Angel.** In the early Church it was believed that each individual was under the care of a particular angel, also that a good angel and a bad angel were in constant conflict for the possession of each man's soul. Of Biblical references, Gen. 24, vv. 7, 40; 48, v. 16; Ex. 23, vv. 20, 23; 32, v. 34; 33, v. 2; Ps. 91, v. 11; Dan. 3, vv. 25, 28; 6, v. 22; Matt. 18, v. 10; Rev. 1, v. 20; 2, v. 1 are among those cited in this connexion. The theme of the guardian angel is frequent in literature, and is used by the poets, from Shakespeare downwards. See Angel.

**Guards.** In the military sense, soldiers of superior type, prestige, and privilege. They were originally the bodyguard of emperors and kings, and in many countries the nucleus of the standing army. Famous bodies of guards were the Praetorians at Rome, the Gardes du Corps and Swiss Guards in the service of the kings of France, the old and young Guard of Napoleon, and the Papal Guard. Up to the time of the First Great War the Prussian Guard was considered the *corps d'élite* of the German army. The Red Army has guard formations.

In England the kings had their bodyguard from early times, and the yeomen of the guard and the king's bodyguard for Scotland are survivals of that period. The existing Guards date from the time of Charles II, and were then divided into horse and foot. The horse guards consist now of two regiments, the Life Guards and the Royal Horse Guards, collectively called the Household Cavalry. The foot guards are the three old regiments, 1st, 2nd, and 3rd, or Grenadier, Coldstream, and Scots Guards, to which the Irish Guards were added in 1902 and the Welsh Guards in 1915. Together they form the Brigade of Guards. During the First Great War a new unit, the Machine Gun Guards, was temporarily established. The Guards Armoured Division (*v.i.*) was a unit of the Second Great War. The title of Dragoon Guards is merely a name given to certain cavalry regiments. The national memorial to the Guards' services in 1914-18 was unveiled Oct. 16, 1926, on the Horse Guards Parade, London.

#### Guards Armoured Division.

Formation of the British army in the Second Great War, made up of regiments and battalions of the Household Brigade. The well-known badge worn by the Guards division in the First Great War was reintroduced for it; the sign was a white eye on a blue shield with a red border. This division was formed in Sept., 1941, and as part of 8th corps landed in Normandy in June, 1944, took part in the fighting at Caen and Falaise, and led the advance to the Somme.

It was the first formation to enter Brussels on its liberation, Sept. 3; advanced to Nijmegen in an attempt to link up with the 1st airborne division at Arnhem; and took part in the operations that cleared the area between the Meuse and Rhine, Feb.-March, 1945. The division crossed the Rhine and fought its way across Germany to Bremen and Cuxhaven, accepting the surrender of the latter port in May. On June 10 it was converted to an infantry unit and designated the Guards division.

**Guards' Chapel.** The Royal Military Chapel, known as the Guards' Chapel, is in Wellington Barracks, Birdcage Walk, London. By a direct hit from a flying bomb during morning service on June 18,

1944, it was virtually destroyed. Few of the congregation, which numbered 180, escaped death or injury. A large metal hut was erected on the site of the former nave. The chapel was opened 1838, and reconstructed 1877-79. It contained hundreds of memorials to officers and many colours.

In 1947 it was proposed that the Household Cavalry should share with the Guards the use of a rebuilt chapel and that an exterior hall and cloister should commemorate men of the Guards regiments and Household Cavalry who fell in the Second Great War.

**Guárico.** Large inland state of Venezuela, having a river of the same name. It is a level grass plain bounded on the S. by the Orinoco. Cattle, horses, and mules are reared. The capital is San Juan. Pop. 135,089.

**Guarini, GIOVANNI BATTISTA** (1537-1612). Italian poet. Born at Ferrara, Dec. 10, 1537, he was for some time a professor at the university there. At the age of 30 he entered the service of the duke of Ferrara. He is chiefly remembered as the author of *Il Pastor Fido*, a pastoral drama first produced 1585; and wrote *Rime*, 1601. He died at Venice Oct. 6, 1612.

**Guarneri** or **GUARNERIUS.** The name of one of the three great families of Italian violin makers of Cremona, who flourished during the 17th-18th centuries. Andreas, first of the family, was a companion of Stradivarius in the workshop of Amati, and his work dates from about 1650-95. He was succeeded by his sons, Peter and Joseph, and his grandson, Peter, son of Joseph: but the most celebrated of the family was his nephew, Joseph. He was known as *del Gesù*, because the letters I.H.S. appear after his name on the labels of his violins. His finest instruments date from 1725-40. Consult *The Violin Makers of the Guarneri Family*, W. H., A. F., and A. E. Hill, 1932.

**Guarujá.** A resort in Brazil, seen in a popular excursion from Rio de Janeiro. The usual trip past the famous orchid garden on the sea front, returning along the Santos Beaches to Santa Terezinha, whose summit gives a superb view of Rio Bay.

**Guastalla.** City of Italy, in the prov. of Reggio nell' Emilia. It stands near the river Po, 19 m. by rly. N. of Reggio. Founded by the Lombards in the 7th century, it was the scene in 1734 of an Austrian defeat by French and Sardinian forces. Pop. (1951) 13,678.



Guards Armoured Division badge



**Guatemala.** Republic of Central America. It has an area of 42,042 sq. m. and is bounded on



Guatemala arms

N. and W. by Mexico; S.W. by the Pacific Ocean; S. by Salvador and Honduras; E. by British Honduras and the Caribbean Sea. The Gulf of Honduras, an arm of the Caribbean forms the 70 m. Atlantic coastline, on which is the harbour of Puerto Barrios handling 75 p.c. of the import trade. The Pacific coastline is about 200 m. long with San José as its most important port. Both Puerto Barrios and San José are connected by railroad with the capital, Guatemala City, largest town in Central America, and are linked by a 5,000-mile network of motor roads with most parts of the republic and with neighbouring countries, and by air with all parts of N. and S. America.

The country is divided into five regions; the lowlands of the Pacific coast; the volcanic mountains of the Sierra Madre, which form the main watershed between the Pacific and Atlantic river systems; the series of high valleys, lying north of the main mountains, enclosed by peaks; the mountains of the Atlantic littoral; and the great plains of Petén, a level, undulating country, comprising about one-third of the total area of the country. Earthquakes are of frequent occurrence, but only two of the numerous volcanoes are still active, Santa Maria (12,300 ft.) being the more so. Tacana (13,330 ft.) and Tajumulco (13,814 ft.), both near the Mexican frontier, are the highest peaks.

Guatemala is well watered with short and rapid streams on the S.W. and slower, more developed rivers on the E. The two main rivers are the Motagua (250 m.) and Cajabon (180 m.), both navigable for light craft and flowing into the Gulf of Honduras; the Usumacinta, which forms part of the boundary

with Mexico, flows into the Bay of Campeche. The larger lakes are Izabal (36 sq. m.), Petén (27 sq. m.), Atitlán (17 sq. m.), and Amatitlán (9 sq. m.).

The chief industry is agriculture. Guatemala is exceedingly fertile. Coffee normally constitutes about 70 p.c. of the exports, bananas (about 20 p.c.) coming next. The chief coffee districts are in the highlands on the Pacific slope from Guatemala City to the Mexican border, and in the centre around Coban. There are estimated to be over 100,000,000 coffee plants yielding about 920,000 bags. The banana plantations near Puerto Barrios on the Atlantic slope are now rivalled by new banana estates recently opened up on the Pacific side for the supply of the Californian market, and the exports amount to about 4,600,000 bunches in normal years. Guatemala has almost a monopoly of the chicle gum, used for chewing gums in N. America and grown mostly in the Petén province. Other crops include maize, the staple food of the people; rice of excellent quality; beans; soya beans, recently introduced; tobacco; wheat, now increasingly cultivated; and cotton of short staple but virtually immune to insect pests, white, and of exceptional strength. Two cotton mills supply 40 p.c. of the native requirements. There are important cattle estates on the Pacific coast, and live cattle are exported. The official census of live-stock in 1947 showed 911,000 cattle; 618,000

sheep; 374,000 pigs. Guatemala exports large amounts of oil of citronella. Other products are coconuts, horn, and honey. Of the last about 2,500,000 lb. are exported annually with over 110,000 lb. of beeswax. Production of rubber and quinine increased during 1939-45.

There is little mining. About 90,000 oz. of gold are produced from alluvial deposits. Sulphur is obtained almost pure from the volcanoes. White marble is quarried near Zacapa, and there is a limited production of lead, chromium, manganese, and mica. There are also deposits of silver, coal, lignite, tin, cinnabar, antimony, plumbago, asbestos, bitumen, porphyry, and zinc.

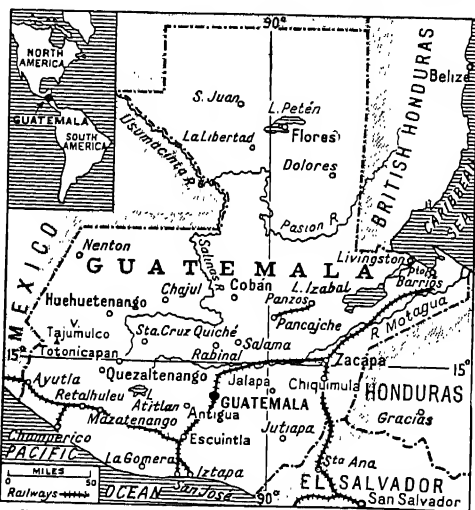
#### Wealth of Timber

The country is rich in timber, notably mahogany, cedar, and dyewoods. The N. provinces contain vast unexplored forests, and about 150 varieties of timber have been classified. Exports of mahogany, pine, and balsa wood amount to about 30,000,000 cubic ft. annually. The water power resources of the country, estimated at 1,300,000 horse-power, have been developed only to the extent of 16,500 h.p.

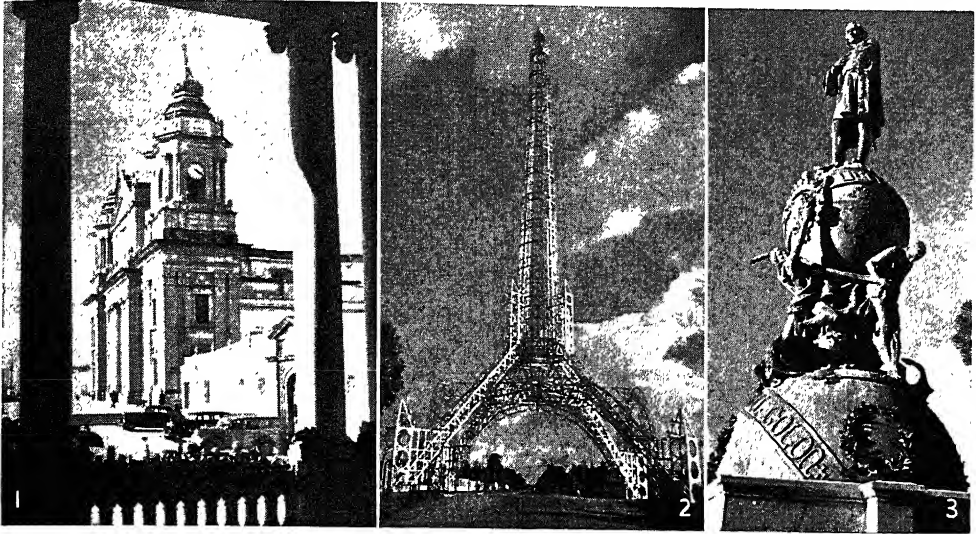
The bird and forest life of Guatemala is remarkable, and the thick jungles swarm with chattering monkeys and parrots. Other animals are the cougar, jaguar, tapir, antbear, wild pig, ocelot, puma, deer, and armadillo. Reptiles include the alligator, iguana, turtle, boa, and many other kinds of snakes. Insect life is abundant and annoying, including mosquitoes, locusts, tarantulas, and grasshoppers.

As a result of recent road-making almost all of the cities of any importance can be reached by motor car over well-made roads at any season of the year. From the capital, motor-bus services run to San Salvador, capital of Salvador, and to regions covered by nearly 5,000 miles of highways. The Aerovias de Guatemala runs frequent local air services from the capital.

The unit of currency is the quetzal, with an exchange value of \$1.00, U.S. currency, sub-divided into silver coins of quarter quetzal, ten cents, and five cents; copper coins of two cents, one cent, and half a cent. The U.S. \$ is legal tender. The official language is Spanish; there is complete religious liberty, Roman Catholicism being the dominant religion. The metric system of



Guatemala, Central America. The inset map shows the position of the republic in relation to the rest of the American continent



Guatemala City, Central America. 1. The cathedral, replica of the one destroyed by earthquake in 1918. 2. Aviation beacon, known as the Tower of the Reformer, spanning the highway from the city to the airport; built in 1935, it commemorates the former president, J. R. Barrios. 3. Memorial to Christopher Columbus in Central Park

weights and measures is used, but old-fashioned Spanish standards are still current in country districts.

Of the pop. (1950) of 2,787,030 between 50 and 60 p.c. are pure Indian. Most of the remainder are of mixed Spanish and Indian blood, with small numbers of pure Spanish stock and a few Negroes. Large numbers of the Indians are closer to aboriginal habits and life than in any other section of N. or S. America.

Education is free. The university of Guatemala, founded 1678 as the university of San Carlos de Borromeo, is situated at the capital. Military service is compulsory between the ages of 18 and 50.

During the first thousand years of the Christian era, the ancient Mayan civilization flourished here, followed by the Aztec culture, but both were preceded by a nameless culture older than either. In addition to the many mounds and pyramids, there are architectural remains, much eroded by rainfall and masked by jungle vegetation, of volcanic stone, wonderfully carved with colossal heads and figures of gods, notably near San José, Baúl, Pantaleón, Quirigua, Tikal, and Chacula.

Guatemala was conquered by Pedro de Alvarado, 1522-24, and was ruled by Spain for nearly 300 years, becoming independent of Spain in 1821 and joining the confederation of Central America, which lasted until 1839. In 1854,

Rafael Carrera, an obscure Indian, was appointed president for life; he died in 1865, and was succeeded by General Cerna, who was deposed in 1871 and succeeded by Justo Rufino Barrios, who formed an alliance with Honduras against Salvador, later declaring himself supreme head of Costa Rica, Nicaragua, Honduras, and Salvador, as well as Guatemala. He was killed in battle and the new president, General Manuel Barillas, made peace. Civil war in 1906 was quelled by the joint intervention of President Theodore Roosevelt and President Porfirio Diaz of Mexico. Guatemala declared war on Germany, Italy, and Japan, in Dec. 1941.

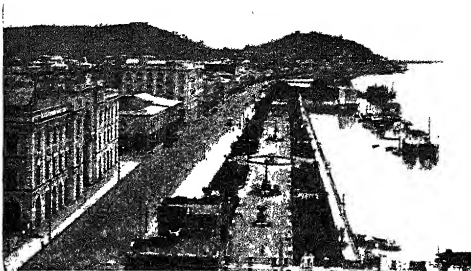
Under the new constitution, established 1945, there is a single chamber national assembly of representatives (one for every 50,000 inhabitants) chosen for a term of four years by direct popular vote, one half being elected every two years. Representatives are not eligible for re-election until after one term has elapsed. The president is elected for six years, and is ineligible for re-election for another twelve years. Should a president attempt to succeed himself the constitution sanctions rebellion. Women over 18 who can read and write may vote and hold office; all men over 18 have the vote and if illiterate may hold municipal but not national offices.

Guatemala is administratively divided into 22 departments.

Principal towns are Guatemala City, the capital (293,998); Puerto Barrios (26,003); San José (10,784); Antigua, the former capital (22,839); Coatepeque (26,733); Cobán (29,242); Escuintla (47,444); Jalapa (45,174); Mazatenango (28,261); Quetzaltenango (36,200); Quiché (17,830); Retalhuleu (19,700); San Marcos (11,300); Sololá (16,233); Totonicapán (30,103); Zacapa (24,033).

The climate, depending on the altitude, varies greatly. Between 3,000 ft. and 8,000 ft. the days are warm and the nights cool. The coastal lands and N. regions, low-lying, hot, humid, tropical, are covered with dense jungle. The rainy season is May to Oct. See Honduras, British.

**Guatemala.** Capital city of the republic of Guatemala, Central America, and largest city in Central America (pop. 293,998). On a plateau, 4,880 ft. alt., it has tropical highland climate (temp. 45°-85° F.; rainfall 45 ins. a year). Excessive rain in 1949 caused floods which killed 4,000 and rendered 70,000 homeless. It is the commercial centre of the country and is connected by rail with the two main ports of Puerto Barrios on the Atlantic coast and San José on the Pacific coast, as well as by a network of automobile roads. There is also a good airport. The city was founded in 1776. After the destruction by earthquake of the former capital, now called Antigua, some 25 m. distant, but the new capital was itself



Guayaquil, Ecuador. The 2½-mile water-front, flanked by consulates, warehouses, and shipping offices

destroyed by earthquake on Jan. 3, 1918. In 1920 the rebuilding of the city was begun, being completed in 1928. Its surroundings of green hills and stark volcanoes are impressive. The streets are wide and the public buildings, including the national palace, chamber of deputies, university, museum, and institute of public health, are imposing. The four principal churches, the cathedral (an exact replica, completed 1940, of the one destroyed in the 1918 earthquake), Cerro del Carmen, La Merced, and Santo Domingo, are exceptionally beautiful even in a continent famous for its beautiful churches.

**Guava** (*Psidium guajava*). Small tree of the family Myrtaceae, a native of the W. Indies. The branches are four-sided, the leaves opposite, oval, and downy beneath, and the flowers white, single or in clusters of three. The fruit is apple- or pear-shaped, with thin, yellow rind filled with pulpy yellow or red flesh, of acid-sweet flavour, in which are numerous hard, kidney-shaped seeds. It is made into guava jelly and guava cheese. The purple guava is *P. catilleanum*, a native of Brazil.

**Guaviare**, GUAYABERO, OR LESSEPS. River of Colombia, a tributary of the Orinoco. It rises in the Cordillera near Bogotá, and flows generally E. for 700 m. It is navigable for small craft for most of its course.

**Guayaquil** OR SANTIAGO DE GUAYAQUIL. The chief seaport and commercial city of Ecuador, capital of the prov. of Guayas. It stands on the W. bank of the Guayas, 30 m. from the mouth. It is the port for Quito, from which it is about 288 m. S.S.W. by rly. and with which it is joined by airline and the Simon Bolivar highway.

building. The university is a famous seat of learning. There are large shipyards and a good harbour, protected by a break-water.

Manufactures include liquors, soap, mineral waters, alcohol, hats, and food products, and there is trade in tobacco, hides, cotton, rubber, bark, cacao, quinine, and metals. Export of cacao hence is still the economic mainstay of Ecuador. The port is visited by European steamers via the Panama Canal. A conflagration in 1896 destroyed much of the city. Pop. 159,937.

**Guayaquil**, GULF OF. Large inlet of the Pacific Ocean, on the W. coast of S. America, between Ecuador and Peru. It is 100 m. wide at its mouth, and contains the island of Puná, 32 m. long and 12 m. broad.

**Guayas**. Coastal province of Ecuador, comprising the low alluvial districts surrounding the Gulf of Guayaquil, and including since 1885 the Galápagos Islands. It is heavily forested and traversed by many rivers. The climate is hot, damp, and unhealthy. The cultivation of cacao is the main industry; coffee, cotton, rice, and tobacco are also produced. Apart from the Quito and Guayaquil rly. in the E. there are no facilities for land transport, all produce being carried by water. Guayaquil, the capital, is the only considerable town in the prov., which has an area of 8,331 sq. m. (excluding islands) and in 1955 had an est. pop. of 664,563.

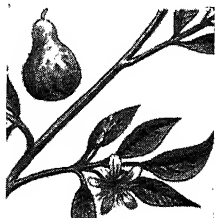
**Guaycuru**. Family of primitive S. American Indian tribes, mainly in the Gran Chaco, N. Argentina. Their speech is more guttural and primitive than that of the Guarani. See Abipones; Charruas; Tobas.

**Guaymas**. Seaport of Mexico, in the state of Sonora. Situated in the Gulf of California, it has a fine natural harbour, affording secure anchorage, and is connected by a line to Nogales with the rly. system of the U.S.A., also by rly. with Mexico City. Chief exports are gold, silver, and pearls, and the sea fishing is unexcelled on the Pacific coast. Pop. 11,000.

**Gubbings** OR GUBBINS (Dialect-word, fish-parings). Contemptuous name formerly given to an uncivilized community in the vicinity of Brent Tor, Devon, England. They were reputed in Fuller's Worthies of England, 1662, to have descended from several social outcasts two centuries earlier, and to have multiplied without marriage. They occupied mean hovels or caves, subsisted on pilfered sheep, and spoke a debased local dialect. They developed great feistiness of foot, avenged all wrongs, resisted the civil power, and were governed by an elected king. The tradition was graphically utilised in Kingsley's *Westward Ho!* The colloquialism "greedy Gubbins" as a variant for greedy guts still lingers. See Doones, The.

**Gubbio**. City of Italy. In the prov. of Perugia, it is the ancient Iguvium and the medieval Eugubium. It lies at the base and on the slopes of Monte Calvo, at an alt. of 1,600 ft., 26 m. south of Urbino. The city is typically medieval, with many old palaces and churches. The cathedral dates from the 13th century, and the Gothic palace of the dukes of Urbino was rebuilt in Renaissance style. The municipal palace contains the bronze tablets known as the Eugubine Tables (*q.v.*).

The Palazzo dei Consoli (1332-46), a huge pinnacled building with



Guava. Flower and fruit of this West Indian tree



Gubbio, Italy. Church of S. Giovanni Battista. On the left, part of the Palazzo dei Consoli

a tower, is now a national monument. It received one shell hit in the Second Great War. Above this palace stands the convent of Sant' Ubaldo. The Festa dei Ceri (Feast of Candles) is an interesting procession through the city to the convent, which takes place annually on May 15. Gubbio has long been famous for its majolica ware. Pop. (1951) 36,091.

**Guben** (Pol. Gubin). Town and rly. junction on the right bank of the Neisse, 22 m. S. by E. of Frankfurt-on-Oder. It has textile and other industries, including the making of hats and cloth, also pottery, paper, etc., and its buildings include a Gothic church and an old town hall. It is an old town and suffered much in various wars. After being in turn under the rule of Bohemia and Saxony, it passed to Prussia by the treaty of 1815. It came under Polish administration in 1945. Pop. 45,000.

**Gubernatis**, ANGELO, COUNT DE (1840-1913). Italian scholar. Born at Turin, April 7, 1840, he became professor of Sanskrit at Florence in 1863, but resigned the position on marrying a relative of Bakunin (*q.v.*), with whose revolutionary theories he was impressed. He was re-elected to the professorship in 1867. In 1876 he was Italian delegate at the international congress of Orientalists. He founded the Indian Museum at Florence, and in 1891 became professor of Sanskrit at Rome. He died Feb. 26, 1913. His chief works include *Zoological Mythology*, 1872; *La Mythologie des Plantes*, 1878-82; *Manzoni*, 1878; *Peregrinazioni Indiani*, 1886-87; *La Serbie et les Serbes*, 1897; *La Roumanie et les Roumains*, 1898.

**Gudbrandsdal**. Valley dist. of S. Norway. It is the central part of the main valley, with ramifications of the river Loughen. Emerging from Lake Mjösen, this river flows N.W. to Møre co., the Gudbrandsdal running from the Romsdal to Lillehammer. British forces landed at Aandsnes in April, 1940, and advanced to Dombaas and Lillehammer, but were forced to withdraw in the same month.

**Gudea**. A ruler of Lagash in Babylonia, c. 2050 B.C. He is known by the remarkable series of portrait statues in polished diorite found by de Sarzec at Telloh (most of them were placed in the Louvre), which are among the finest examples of Sumerian art in its latest phase (*see p. 830*). His inscriptions relate that he adorned the temple of the city-god Ningirsu with timber, precious stones,

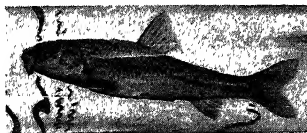
gold, silver, copper, and bitumen from distant lands of Syria and the Persian Gulf.

**Guden**. Largest river of Denmark, in Jutland, 80 m. long. It flows N.E. through Viborg into Randers Fiord, 15 m. N.E. of Randers.

**Guderian**, HEINZ (1888-1954). German soldier. He was born at Kulm (Polish Chelmo), then in Prussia, within Poland from 1919, and educated at cadet schools in Karlsruhe and Gross Lichterfelde. Commissioned in a Jaeger regiment in 1906, he served on the Western Front and as a staff officer in Italy, 1914-18. In 1933 he was given command of Germany's first regular tank corps; and in 1935 of all armoured formations. He led the Nazi advance into Austria in 1938. In a textbook he set out the strategy of mechanised warfare, based upon Charles de Gaulle's *Vers l'Armée de Métier* (Eng. trans. *The Army of the Future*, 1940), which, published in 1934, had roused no interest in either France or the U.K.

Hitler authorised Guderian to create the panzer divisions which helped to destroy the Polish and Allied armies in 1939-40. But in the campaign against Russia he met with reverses, 16 divisions under him being routed at Kaluga in 1941. Guderian was responsible for much of the strategy and equipment of Rommel's armour in the N. African campaigns. After the attempt on Hitler's life in July, 1944, Guderian succeeded Jodl as chief of the general staff; in Oct. he was supreme commander on the Russian fronts; and he was still holding a command at the German surrender in May, 1945. Panzer Leader, an English trans. of his autobiography, was published in 1951. He died May 14, 1954, at Schwangen in the German Alps.

**Gudgeon** (*Gobio*). Genus of small fresh-water fishes, of which one species is common in most British rivers. It is related to the



Gudgeon, a small fresh-water fish

carp, is usually found on the gravelly bed of the stream, is easily caught, and is fairly good eating.

**Gudger Pin**. Pin connecting the piston-rod with the connecting rod at its small end, allowing the latter freedom of movement.

The term is applied to any such connecting pin. *See* Internal Combustion Engine; Steam Engine.

**Gudrun** OR KUDRUN. German romantic epic. In its existing form (13th century) it is of later date than the Nibelungenlied, to which in metrical form it is somewhat similar. It deals with the romance of the heroine whose name it bears, daughter of a Friesland king, and of her parents, and embodies many legends of the North Sea and coasts of Normandy.

**Guebwiller** OR GEBWEILER. Town of France, in Alsace (Haut-Rhin dept.). It is situated 14 m. S.S.W. of Colmar at the entrance of the valley of the Lauch, a stream running down from the Vosges Mts. The church of S. Leodegar, begun in 1182, and restored in modern times, deserves mention. The industries include the manufacture of sugar, textiles, machinery, etc., and near by is produced one of the best brands of Alsatian wines. Pop. 10,085.

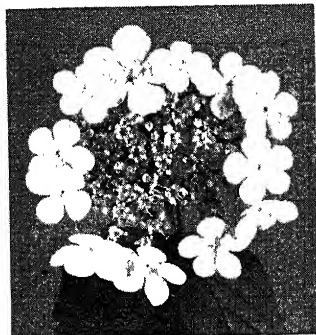
**Guedalla**, PHILIP (1889-1944). British historical writer. Born of Jewish parentage, March 12, 1889,



Philip Guedalla, British writer

he was educated at Rugby and Balliol College, Oxford. Called to the bar in 1913, he practised for 10 years. *Ignes Fatui*, a volume of his parodies, appeared in 1911, and in 1914 he published *The Partition of Europe*, 1715-1815. With *Supers* and *Supermen*, 1920, he made his reputation as a witty and vivid portrayer of character. His best-known studies included *The Second Empire*, 1922; *Palmerston*, 1926; *The Duke* (biography of Wellington), 1931; *The Hundred Days*, 1934; *The Two Marshals* (Bazaine and Pétain), 1943. Guedalla's style in biography was likened to that of the cinema, with its devices of close-up, flash-back, etc. He died Dec. 16, 1944.

**Guelder Rose** (*Viburnum opulus*). Small tree of the family Caprifoliaceae, native of Europe, N. and W. Asia, and N. America. The smooth leaves are cut into three strongly toothed lobes. The whitish flowers form a cluster of which the central ones are small ( $\frac{1}{4}$  in.) and perfect, of a creamy tint, while those of the outer ring are three times the size, quite white, and without pistil or



Guelder Rose. Cluster of flowers of this hedgerow tree

stamens. In the garden guelder rose, or snowball tree, all the flowers are sterile like this outer row. The wild plant is more beautiful, for in autumn the fertile flowers have been succeeded by large juicy berries of a wonderful translucent red. The flowers secrete nectar, and on the leaf-stalk are cup-shaped glands filled with nectar for ants, which keep the plant free from caterpillars.

**Guelf** or **GUELF**. English form of the German *Welf*, the name given to one of the parties in the medieval struggle between Guelphs and Ghibellines (*v.i.*). Meaning whelp, it began as the Christian name of a family of nobles who were powerful in Bavaria in the 11th and 12th centuries. One of them, Henry the Proud, became duke of Bavaria, and also duke of Saxony, and his son Henry the Lion was one of the most powerful of the German princes. The word, used as the battle cry of their followers, was taken to Italy, where it became Guelpho.

Guelf was also used as the name of the family to which the electors of Hanover and therefore the sovereigns of Great Britain from 1714 to 1837 belonged, these being descended from the early Welfs. It became more prominent during the years that followed the loss of his throne by George V of Hanover in 1866. His cause was spoken of as that of the Guelphs; the sum of money set aside for him was known as the Guelph fund; and there was a Guelph press. See Hanover; Wettin.

**Guelf**. A city of Ontario, Canada, capital of Wellington co. It stands on the Speed river, about 60 m. W. by S. of Toronto. It is served by the C.P.R., and the C.N.R., and is unique in having its own street rly., which, leased to the C.P.R. since 1887, has reduced the municipal taxes yearly. There are factories making

iron goods, furniture, carpets, textiles, beer, soap, etc., the motive power being derived from the falls of the Speed; and the town is a market for agricultural produce. It has a city hall and market, and is the seat of Ontario Agricultural College and Macdonald Institute, visited annually by 50,000 farmers. Guelph was founded in 1827 by John Galt (*q.v.*). Pop. (1956) 33,860.

**Guelphs and Ghibellines**. Political factions, prominent in Italian history from the 12th to the 14th century. Primarily they denoted the division into imperialist and anti-imperialist parties, the supporters, that is, of the supremacy of the emperor, as head of the Holy Roman Empire, in Italy, and his opponents, at the head of whom was the pope.

The papacy disputed the headship of Christendom with the emperor, and there was consequently a natural alliance between the papacy and the Guelphs, while the Ghibellines supported the emperor. Theoretically, the Guelphs were the champions of local and popular liberties and freedom from foreign domination; but in the eyes of the Ghibellines they were the champions of a decentralisation which meant anarchy, and also of ecclesiastical ascendancy. The Ghibellines stood for a strong central authority.

In the middle of the 13th century the house of Hohenstaufen was finally overthrown; imperialism and papalism ceased to provide the fundamental distinction. But party factions still clung to the old labels, and they became even more prominent as designating local parties than they had been as expressing great political principles, for which, however, they still stood in the minds of idealists such as Dante. The feud, which was especially strong in Florence, was carried into almost every relation of life, and each had its distinct habits and customs in dress, manners, and the like. In the course of the 14th century the old names as well as the old principles were gradually displaced, and virtually disappeared in the 15th century. See Ghibelline; Hohenstaufen.

**Guenon** (Fr., monkey). Large group of African monkeys of the genus *Cercopithecus*. They are slender with long tails and small callosities on the buttocks. Their hair has a mottled appearance, due to each hair bearing coloured rings. They are usually found in small droves in the forests, and are

very pugnacious. In captivity they make good pets, as they are docile and hardy, and are easily taught to perform tricks. See Monkey.

**Guérara**, **GOURARA**, or **GERARA**. District in the Algerian Sahara, forming the most northerly chain of oases S. of Algeria proper. It consists of the oases of Tin Erkouk, Timimoun, Tabelkoza, Sebkhah, Fatis, Tahantas, and Charouin. It contains over half a million date palms, consisting of more than 40 species. It was occupied by France in 1902.

**Guercino**. Nickname of the Italian painter Barbieri (*q.v.*).

**Guéret**. Town of France. In the dept. of Creuse, of which it is the capital, it is 48 m. N.E. of Limoges, standing at the foot of the Puy de Gaudy. The chief building is the prefecture, a house of the 15th century, and there is a museum, but there are no remains of the abbey of S. Pardoux round which the town grew. There are a number of industries, and the town is a market for the produce of the surrounding district. It was formerly the capital of La Marche. Pop. (1954) 10,131.

**Guereza** (*Colobus*). Group of African monkeys, notable for the fact that the thumb is either absent or rudimentary. They include about 12 species, but are little known, as they live in the tops of forest trees and seldom survive captivity. Most are black and white, and have long silky hair valued in the fur trade. See *Colobus*; Monkey.

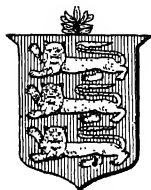
**Guericke**, **OTTO VON** (1602-86). German scientist. Born at Magdeburg, Nov. 20, 1602, he studied at several German universities, also at Leyden. He was city engineer at Erfurt, and was burgo-master of Magdeburg in 1646. He died at Hamburg, May 11, 1686. Guericke is best known as the inventor of the air pump. He also invented the manometer, and discovered that two bodies equally charged with electricity will repel one another.

**Guérin**, **CHARLES** (1873-1907). French poet. Born at Lunéville, he was the son of a wealthy family of manufacturers and led a life of leisure. His first important work was *Le Coeur Solitaire*, 1898, a volume of elegiac poetry overcast with melancholy. *Le Semeur de Cendres*, 1901, was his masterpiece. A period of inner struggle was ended by his conversion to Roman Catholicism, and *L'Homme Intérieur*, 1905, showed him in more tranquil mood. Within his range, Guérin is regarded as one of the great modern French poets.

**Guérin, Eugénie de** (1805-48). French writer. She was born at Albi, Tarn, sister of the poet Maurice de Guérin (1810-39), to whom she was devotedly attached. Her *Journal et Lettres*, published in 1862, Eng. trans. 1865, reveals her as a woman of notable character, a mystic, and a strong Catholic. She died May 31, 1848. Matthew Arnold included a study of brother and sister in his *Essays in Criticism*.

**Guernica.** Town of Spain, in the province of Biscay, 17 m. E.N.E. of Bilbao. In 1937, during the Spanish civil war, Gen. Franco's forces were advancing on Bilbao, and on April 27 this undefended town, the "holy city" of the Basques, was razed to the ground by German aircraft supporting Franco's Nationalist forces. Some 4,000 bombs were dropped, fire followed. The Spanish govt. gave casualties as 1,654 killed, 889 wounded, out of a pop. of c. 7,000. This first manifestation of a new savagery produced world-wide shame and horror, vividly expressed in a gigantic painting by Picasso (see p. 199). Rebuilding was completed in 1946. Pop. (1950) 6,441.

**Guernsey.** One of the Channel Islands. Second in size to Jersey, it is about 7 m. long and 6 m.



Guernsey arms

broad, and has an area of  $24\frac{1}{2}$  sq. m. St. Peter Port, the capital, on the S.E. coast, and St. Sampson's are the only places of any size, the others being small fishing and inland villages.

From St. Peter Port steamship communication is normally maintained with Southampton, Weymouth, Plymouth, London, and France; there are also daily air services to the English mainland, and to Jersey and Alderney.

Much of the land is divided into small holdings, and some cereals are grown. The Guernsey breed of cattle is famous. Granite-quarrying and fishing have declined, and the chief industry is market gardening, large quantities of tomatoes, grapes, flowers, etc., grown chiefly under glass, being produced, mainly for the English market.

A picturesque island, especially in the S., where the rugged coast is broken by numerous bays, Guernsey is a favourite holiday resort. There are numerous prehistoric remains and notable buildings of later date include Castle Cornet, a fortress begun in the 13th cent., and old churches at St. Sampson's, St. Martin's, Vale, and Côtel. Domestic architecture includes some picturesque manor houses.

The bailiwick of Guernsey includes Alderney, Sark, Herm, and Jethou. Guernsey, whose new constitution came into force, Jan. 1, 1949, is governed by committees appointed by the two assemblies, the states of deliberation (legislature) and the states of election. Justice is administered by the royal court. The chief officials, appointed by the crown, are the lieut.-gov., the bailiff (who presides over both assemblies and the royal court), and high legal officials. The island is in the diocese of Winchester. At St. Peter Port are Elizabeth College, a public school, and also a Ladies' College.

Although Guernsey was demilitarised early in the Second Great War, the island was bombed and machine-gunned by the Germans before they occupied it on July 1, 1940. It was liberated May 9, 1945. Civil government

was restored on Aug. 25, the new governor being Maj.-Gen. (later Lt.-Gen. Sir Philip) Neame, V.C. In 1946 Guernsey purchased the island of Herm from the British govt. Pop. (1951) of bailiwick, 45,480, of island, 43,547. Consult Archaeology of the Channel Is., T. D. Kendrick, 1928; Guernsey Past and Present. R. Durand. 1933.

**Guernsey Lily.** (*Nerine sarniensis*). A bulbous herb of the family Amaryllidaceae, a native of S. Africa. The strap-shaped leaves



Guernsey Lily. Flower-head and strap-like leaves

appear later than the flowers, which are lily-like, salmon-coloured, and form a large cluster at the top of a stout flower-stem.

**Guerrazzi, Francesco Domenico** (1804-73). Italian author and politician.

Born at Leghorn, Aug. 12, 1804, he studied law at Pisa,

but early turned to literature and politics. A political agitator, he was often imprisoned, and while in prison wrote his principal work, *The Siege of Florence*, 1836. He died Sept. 23, 1873. *Pron.* Gwerratsi.

**Guerrero.** S.W. state of Mexico, bordering the Pacific. Situated on the declivity of the Anahuac plateau, it is extremely mountainous, the greater part of its surface being covered by the Sierra Madre. The valleys of the Rio de las Balsas, or Rio Mexcala, and the smaller streams produce cereals, coffee, cotton, tobacco, and other crops. The mineral wealth is extensive. The capital of the state is Chilpancingo. Area 24,885 sq. m. Pop. (1950) 919,386.

**Guerrilla Warfare.** Operations of inhabitants who take up arms to harass an invader. The word guerrilla is Spanish, a diminutive of *guerra*, war. Guerrillas recognize no laws or customs of war; they present no target for a disciplined force to attack; living off the country, and assisted by the inhabitants, they are independent of transport, and gather and disperse rapidly. They have a widespread intelligence system in the population.

During the French occupation of Spain in the time of Napoleon the Spaniards had an excellent guerrilla system. The S. African War, 1899-1902, was prolonged by guerrillas after the Boer armies had been defeated. Dervishes, Zulus, Burmese, Kaffirs, Maoris, and frontier tribes of India used guerrilla tactics against British forces. The French in Morocco and



Guernsey. St. Peter Port, capital of the second in size of the Channel Islands



Algeria were often outwitted by bands under Abd-el-Krim and Abd-el-Kader.

Guerrillas in the Second Great War tied down Axis troops in China, Norway, Russia, Yugoslavia, France, Poland, Greece, and the Philippines. In Russia they were recognized by the army, which supplied them with arms, ammunition, equipment, and ambulances. It was estimated that they inflicted more than 300,000 casualties on German and satellite troops, besides disrupting lines of communication. The French Maquis grew out of the efforts of young men to avoid conscription for labour and came to control whole districts in Savoy and the Vosges. Before D-day they were in radio communication with Allied headquarters and carried out acts of sabotage against German communications. Gen. Eisenhower reported that their activities were worth three extra divisions. The F.F.I. were recognized by Allied H.Q. and the Germans were warned to treat them as regular forces. The Polish underground army, organized during the siege of Warsaw, was commanded by Gen. Bor, or Komorowski. Three railways connecting Germany with the Eastern front passed through Poland, and in June, 1944, 54 trains were derailed. Also 379 Gestapo agents were killed, and 71 actions fought. A German army was immobilised in Greece and Yugoslavia for three years by Greek patriots, Marshal Tito's partisans, and the Chetniks. Guerrilla tactics were employed by the Long Range Desert Group in N. Africa and the Chindits (*q.v.*) in Burma.

**Guesclin, BERTRAND DU** (1320-80). A French soldier. Born in Brittany, he was trained to arms, and when young made a reputation by his skill in the tournament. He fought in the civil war raging in Brittany, 1341-42, and there became one of the most renowned opponents of the English. He was constantly in the field, and his exploits were many and glorious, although more than once he was taken prisoner. When peace was made in 1360, he marched into Spain at the head of an army of mercenaries, and there was again taken by the English at Navarrete. On the renewal of the war between England and France he was instrumental in recovering several districts for his king. He died July 13, 1380. Made constable of France, 1370, he is regarded as the greatest French soldier of his age, and a pattern of chivalry.

**Guest, LADY CHARLOTTE.** Name under which Lady Charlotte Elizabeth Bertie, daughter of the 9th earl of Lindsey, became well known as a Welsh scholar. Born May 19, 1812, in 1833 she married Josiah Guest (1785-1852), an ironmaster who developed his business at Dowlais, Glam., into the firm that became Guest, Keen, and Nettlefold. Their eldest son was made Lord Wimborne (*q.v.*). Lady Charlotte's version of the Welsh text of The Mabinogion, with Eng. trans. and notes, appeared in 3 vols. 1838-49; it marked an epoch in the study of Celtic literature. She also did much to revive the Eisteddfod. She married secondly in 1855 Charles Schreiber (d. 1884), and died Jan. 15, 1895.



Lady Charlotte Guest, British scholar

**Guetar** (great-land). American Indian tribes of semi-advanced culture in central Costa Rica, at the time of the Spanish conquest, situated between the primitive Guatuso and the Talamancan people.

**Gueux, LES** (Fr., the beggars). Name specially applied to those Netherlands who revolted against the Spaniards in the 16th century. The name is supposed to have originated in 1566, when a party of nobles took their petition of grievances to the regent, Margaret, duchess of Parma. To induce her to face them, someone asked if she were afraid of *ces gueux*, these beggars, and the petitioners, men of wealth and position, hailed the epithet as an honour, taking as their symbols the wallet and the bowl of the beggar.

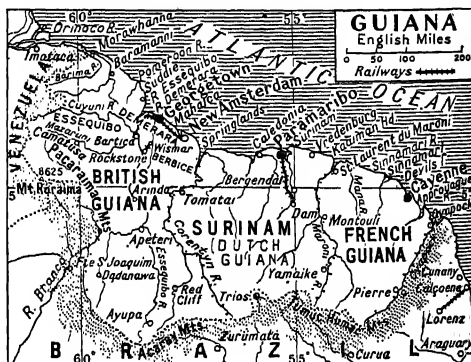
The sequel was the revolt against Philip of Spain, and although the original league was broken up the Dutch republic really arose from it. In the struggle the *gueux de mer*, or sea-beggars, were privateers who, with the connivance of William of Orange, preyed upon the shipping of Spain. Their great exploits were the seizures of Brill and Flushing in 1572.

**Guevara, ANTONIO DE** (c. 1490-1545). Spanish author. Passing his youth at court, in 1518 he became a Franciscan friar and was appointed preacher to the court of Charles V. Made bishop of Guadix in 1527, two years later he published Marco Aurelio con el Reloj de Principes, which appeared in London in 1532 as The Golden Book of Aurelius, Emperor and Eloquent Orator. This Diall of Princes, as a later translation puts it, inspired Lyly's Euphues, 1578, and so the euphuist school of literature. See Euphuism.

**Guevara, LUIS VELEZ DE** (1579-1644). Spanish writer. Born at Ecija, he was educated at the university of Osuna. For a time he was a soldier and afterwards a courtier, but most of his life was devoted to writing. He died at Madrid, Nov. 10, 1644. Guevara wrote over 400 plays and a novel, El Diablo Cojuelo (The Lame Devil), on which Le Sage based Le Diable Boiteux.

**Guggenheim.** Name of a family of American capitalists. Meyer Guggenheim, a Swiss Jew who settled in the U.S.A. in 1847, acquired copper interests in California, and in developing these was assisted by seven sons. The Guggenheims were known as the copper kings, their mining and metallurgical business at one time controlling nearly half the world copper output. The second son, Benjamin (1855-1912), went down with the Titanic. The John Simon Guggenheim memorial foundation was established in 1925 for the advancement of research and for creative work in the arts. Fellowships of about £500 per annum are granted for varying periods.

**Guiana.** Territory in the N.E. of S. America. Bounded W. by Venezuela and E. by Brazil, it is divided into three sections-



Guiana. Map of the British, Dutch, and French colonies on the S. American Atlantic seaboard

British, French, and Dutch Guiana. The general term Guiana is sometimes used to include Brazilian Guiana, territory lying to the S. The surface slopes gently from the level coastal tract to the Tumuc Humac range in the S. and to the Pacaraima range in the W. Large forested areas, inhabited by wild Indians, exist towards the S., which is partly unexplored. Before 1793 this region was divided between France, Spain, Portugal, and Holland. Its coasts were first explored by Spaniards in 1499-1500. See Arawak; consult also Guiana: British, Dutch, and French, J. Rodway, 1912.

**Guiana, BRITISH.** The only British territory in S. America. It is bounded N. by the Atlantic, S. by Brazil, W. by Venezuela, and E. by Surinam. It includes the settlements of Essequibo, Berbice, and Demerara, and has an area of 83,000 sq. m. Inland for a distance of from



British Guiana arms

10 m. to 40 m., the country consists of rich alluvial flats and mudbanks deposited by the numerous rivers. This coastal strip is the only part under cultivation, and virtually the only part inhabited. The land thereafter rises towards the interior and culminates in the ranges of Pacaraima and Acaray in the S.W. and W., Roraima, in the former, reaching an alt. of 8,625 ft.

The chief rivers are the Essequibo (600 m.), the Berbice (350 m.), and the Demerara (180 m.). The first drains more than half the country; the Demerara admits steamers to Georgetown, the capital. The Corentyn or Courantyne on the E. boundary, Demerara, Barima, and Berbice are navigable for about 100 m. from their mouths, other streams for short distances only, being obstructed by rapids and cataracts. The climate is hot and the rainfall heavy; fever is prevalent in the low-lying districts.

The chief products are sugar, rice, coconuts, coffee, cacao, wild rubber, maize, wheat, vanilla, and citrus fruits. Cattle, sheep, horses, pigs, goats, and donkeys are reared. Chief exports are bauxite (2 million tons in 1951), sugar, rum, timber, balata, rice. Gold is mined and precious stones include diamonds of high quality. There are about 154 m. of rly. opened for traffic. In addition there are 366 m. of good roads and 319 m. of

river navigation and canals. Airways operate within the colony and to the W. Indies and U.S.A.

The colony has a governor; a constitution giving adult suffrage was introduced and suspended (owing to Communist infiltration of the majority party) in 1953. The huge water lily *Victoria regia* was found on the Berbice. Kaieteur Falls on the Potaro rank with Niagara and Victoria Falls, dropping 741 ft. over a channel 300 ft. wide. The colony was originally founded by the Dutch, who settled on the Essequibo c. 1620. In 1781 it was captured by the British and, after changing owners several times, was ceded to the British in 1814. Two sites, one 25 m. up Demerara river, the other at Makouria 40 m. up Essequibo river, were leased to the U.S.A. under the Anglo-American naval agreement of 1940 (see Atlantic Bases). The unit of currency in the colony is the dollar. The est. pop. in 1953 was 466,000.

**Bibliography.** Tropical Wild Life in B.G., W. Beebe, G. I. Hartly, and P. G. Howes, 1917; Laws of B.G., Sir C. Major, 1930; Constitutional History of B.G., Sir C. Clementi, 1937.

**Guiana, DUTCH.** This territory, also called Surinam, is so described in this Encyclopedia.

**Guiana, FRENCH.** Oversea department of France, in S. America, until 1947 a colony. It lies between Surinam on the W. and Brazil on the E. and S., while the Atlantic washes its shores on the N. Area 34,740 sq. m. The Maroni river flows along its W. boundary, and the Oyapock marks the E. frontier. Other rivers are the Ouya, Sinnimari, Mana, and Approuague. The continuation of the Acaray range or Tumuc Humac mountains extends along the S. boundary. The flat alluvial tract on the coast is exceedingly fertile; while vast areas are forested.

The chief products are sugar, coffee, cacao, rice, maize, manioc, and bananas. Gold mining is the principal industry. Rubber, pepper, spices, rum, rosewood essence, woods, hides, balata, and fish glue are exported. The colony includes the so-called island of Cayenne, on which stands the capital of the same name. It is separated from the mainland by the forking of a river. The chief ports are Cayenne (which has an airport), Oyapock, and St. Laurent-du-Maroni. The colony is administered by a governor assisted by a council, and is represented in the French parliament by a deputy.

French settlers arrived at Cayenne in 1604. In 1763 the French government dispatched 12,000 emigrants to the colony, but nearly all succumbed to the ravages of disease and the climate. Captured by the British and Portuguese in 1809, it was returned to France in 1814. From 1852 it was a penal settlement, Alfred Dreyfus being a notable prisoner, but in 1946 the transportation of convicts ended. In 1943 popular opinion caused the authorities to sever relations with Vichy and adhere to General de Gaulle. Pop. (1955) 27,863.

**Guicciardini, FRANCESCO** (1483-1540). Italian historian. A Florentine, born March 6, 1483, contemporary and friend of Machiavelli, he was a practical man of affairs, and has been described as the realist where Machiavelli was the idealist. Despite holding frequently opposite views, he cynically adapted himself to the service of rulers, popes, or Medici. In 1534 he retired and devoted himself to his great History of Italy from 1490 to 1532, a translation of which into English by A. P. Goddard was published in ten volumes, 1755-59; with all its defects, one of the most valuable histories ever written. Guicciardini's other writings include a series of political aphorisms, described as "corruption codified and elevated to a rule of life." He died May 23, 1540. Pron. Gwitchardeence.



Francesco Guicciardini, Italian historian From a print

**Guiccioli, TERESA, COUNTESS** (1802-73). Italian mistress of Lord Byron (q.v.). Daughter of Count Gamba of Ravenna, she was married in her 17th year to a man of 60. She was introduced to Byron in April, 1820, and became infatuated with him. Thenceforward, thanks to an alternately complacent and jealous husband (from whom she was subsequently separated), she was associated with the poet to the end of his life. She later married the Marquis Rouillé de Boissy. In 1863 she published her intimate study of Byron. Consult The Last Attachment, I. Origo, 1949.

**Guided Missile.** See Missile.

**Guides, CORPS OF.** Former unit of the Indian army. The corps was raised in 1847 by Sir Harry



Corps of Guides.  
Private of infantry company

Lumsden for service on the Indian frontiers. The troops were more mobile than the regulars, and were the first in the Indian army to wear khaki uniform. A small force, but including both horse and foot, the Guides saw active service almost at once and were constantly engaged in border warfare thereafter. Among the many incidents in the history of the Guides are the march to Delhi during the Mutiny, the march on Kabul in 1879, a share in the Afghan War of 1878-79, and services at the relief of Chitral, 1895. In 1922 the cavalry and infantry were separated, the cavalry becoming The Guides Cavalry (10th Queen Victoria's Own Frontier Force), mechanised 1940; the infantry, two battalions of the 12th Frontier Force Regt. After the partition of British India, 1947, both units became part of the Pakistan army. A regt. of Napoleon I's cavalry was called the Guides.

**Guidon** (Fr.). Crimson silk colours of dragoon regiments of the British army. The lance is 8 ft. 6 ins. long, including the royal crest on top. The flag is 3 ft. 5 ins. to the ends of the points of the swallow tails, exclusive of fringe, and 2 ft. 3 ins. on the lance; the width of the slit at the points of the swallow tail is 13½ ins.; it bears the badge, devices, and mottoes conferred by royal authority for services in the field. *See* Colours; Eagle; Standard.

**Guienne.** Prov. of old France. It was at first a part of Aquitaine, obtaining a separate existence in the 13th century. Its capital was Bordeaux. From 1154 to 1451 it was an English possession. Thereafter it was part of France, and with Gascony formed one of the governments of the *ancien régime*. Since the Revolution it has been divided between the departments of Gironde, Lot, Lot-et-Garonne, Dordogne, and Tarn-et-Garonne. *See* Aquitaine; France: History.

**Guilbert, YVETTE** (1869-1944). French singer and actress. Born in

Paris, she worked in millinery and dressmaking establishments, but her gifts of witty impersonation and her skill as a singer of piquant songs led to café-concert engagements, beginning in 1888 at the Variétés and, in 1890, to successful appearances at the Eldorado and Ambassadeurs, Paris. She was enthusiastically received in London, Rome, Vienna, Berlin, and elsewhere. She toured the U.S.A. several times and opened a school of dramatic diction in New York. She reappeared in London in 1928-29. Her memoirs, *La*



Yvette Guilbert. French singer and actress, long a favourite artist on both sides of the Atlantic

*Chanson de Ma Vie*, were published in 1927. She died Feb. 3, 1944.

**GUILD OR GILD** (A.S. *gild*, payment). Primarily, an association of some kind. Before the Norman Conquest, English and other European people were accustomed to form themselves for social and religious purposes into associations, artificial families of brethren and sisters, called guilds or gilds, from the geld or payment out of which the feasts and masses for the souls of the departed were provided. Such guilds existed side by side with the commercial and industrial guilds of the Middle Ages, in which the religious side was always insisted on. In the 12th century, dealers and the few men engaged in handicraft, who were now making their appearance in the towns, formed themselves into associations to supervise and regulate local trade. No privilege was more coveted in a town charter than the recognition of such an association of merchants.

The merchant guild laid down rules for the honest conduct of trade, managed the markets, but

above all secured for its members freedom from tolls, and the right of keeping much of the buying and selling within the borough in their own hands. Most of the merchant guild were commonly also members of the municipal government; but only gradually did guildship and burghship become identical.

In England the craft guild appears to have developed from the natural grouping together of men engaged in the same kind of work and living in the same part of the town. The purpose may have been at first largely religious, but as industry expanded and highly specialised trades sprang up a need for more detailed supervision in the interest of seller and buyer alike led to the regular formation, under the municipal authority, of responsible organizations of men engaged in a particular trade.

#### Responsibility of the Wardens

It was the duty of wardens and aldermen of the new craft guilds to keep the trade in good repute, making "reasonable ordinances" for the observance of proper standards, providing for skilled workmanship, and perhaps settling prices. Everyone believed there was a just price, which depended on the cost of materials, and on a reasonable wage which would enable the worker to support himself and his family according to the standard of his class. When markets were small, and industry was comparatively simple, such prices and wages were really easy to determine, and general regulations as to methods of work, hours of labour, etc., comparatively easy to enforce, but it was necessary to insist that all who worked at a particular trade should be members of the guild.

Guarantees of character and skill were provided in the system of apprenticeship, which, beginning in the 13th century, soon became an integral part of social and economic life (*see* Apprenticeship). A few years were then spent as a journeyman, paid originally by the day.

As time went on it became increasingly difficult for the journeyman to become a master. Evidence soon appears of a cleavage between the wealthy members, the traders and shopkeepers who were accumulating capital and ceasing to follow their trade in the workshop itself, and the actual producers—hired men, with a new sense of class consciousness, who began to found yeomen guilds, antagonistic to the masters, and using from time to

time the weapon of the strike. Four stages are recognized in the history of English industry. The second stage, that of the guild, which had replaced the family system, was to be slowly superseded by the domestic system in which, before the era of machinery and the factory, capitalists put out work to be done in the homes of the people. Trade was expanding, old towns were decaying, industry was shifting to new centres; the expenses of those still working in guilds were heavy, while the value of membership decreased. In the 15th century, men wanted greater freedom to acquire wealth for themselves, while with the new ideas of individualism in the 16th century the general welfare of the community was forgotten. In the confiscation of the property of the religious guilds under Edward VI, the craft guilds, or companies, also suffered by the loss at least of those funds which had accumulated for purposes now officially regarded as superstitions.

**GUILD SOCIALISM.** The medieval use of the term guild was revived c. 1911 by a school of Socialists who proposed the reconstruction of society on a democratic basis through industrial self-government in the form of guilds. This conception of the guild is on a wider basis than that of the trade union: first, as including all workers without distinction; second, as not merely looking after the economic welfare of its members, but actually carrying on the industry. To coordinate the functions of all individual guilds, a central government of the community should be elected for specific or functional purposes. *Consult Guild Socialism Restated, G. D. H. Cole, 1920.*

**GUILDER OR GULDEN.** Originally a gold, later a silver, coin widespread over Europe. First

same value until the end of the First Great War. In Holland the guilder continues to be the main coin; in Danzig, during the period of the free state, there was a guilder based upon 25 to the £.

**Guildford.** Borough and historic county town of Surrey, England. It stands on the London Portsmouth road 30 m. by rly. S.W. of London, and formerly guarded the ford over the Wey. A by-pass road now skirts the town centre. The steep and picturesque High Street has



Guildford arms

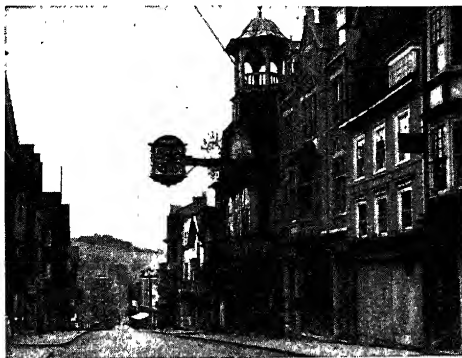
a fine view of the *Hoz's Back* The Hospital of the Holy Trinity, founded by Archbishop Abbott in 1619, is a beautiful building in the style of St. James's Palace, and the royal grammar school with its chained library was founded 1552. The interior of the guildhall is Tudor though its façade is of the 17th century; corporation treasures housed within include a 15th-century mace and a mayoral staff presented by Elizabeth I; and a set of bronze measures, bushel, gallon, quart, and pint, dated 1601. The square Norman keep dates from the early 12th century; and the oldest church, S. Mary's, is of Saxon origin. Holy Trinity Church, an 18th century building replacing an earlier one, served as cathedral for the Guildford diocese formed in 1927. The new cathedral church on Stag Hill is in cruciform style, and will seat 2,000 people: building, begun in 1936, was suspended during the Second Great War, but was resumed in 1947.

Guildford's prosperity once depended on the woollen industry. It now lies in light industry, brewing, and its importance as an agricultural market centre. Guildford, which gives its name to a constituency, supports a repertory theatre and municipal orchestra. The corporation owns 1,200 acres of open spaces. There are independent schools in the neighbourhood. Market days, Tues. and Fri. Pop. (1951) 47,484.

**Guildford.** Town of Western Australia, in Swan district. It is situated on the rly. 9 m. N.E. of Perth, and was one of the earliest settlements in the original Swan River Colony.

**Guildhall.** In medieval architecture, a hall for the meeting of the guild merchants. Its origin was a roofed booth for collecting market tolls. As the local merchant organizations developed, a room for business purposes was added, generally built over the toll booth, and the practice of placing the council chamber of the guildhall on an upper floor, with access to the market place, was retained long after the original toll booth had become a structure of stone or brick.

The guild system was developed earlier in Flanders and N. Germany than elsewhere. Hence the large number of historic guildhalls in the chief cities and towns of these territories, each identified with the staple trade of the locality.



Guildford, Surrey. The High Street looking south-west with the Guildhall on the right and a glimpse of the famous Hog's Back in the distance

In London, the halls of the separate guilds were and are known as company halls. On the Continent, the guild gradually extended its authority to the affairs of the town itself, and the guildhall became the town hall. Owing doubtless to the London example, the municipal buildings of York, Bristol, and other large towns are commonly called guildhalls.

**Guildhall, LONDON.** The home of the City Corporation. Situated at the end of King St. between Aldermanbury and Basinghall St., it was built, 1411-35, approximately on the site of an earlier structure. Most of the medieval timber was destroyed by the Great Fire (q.v.) of 1666. Wren replaced the open roof with a flat ceiling. The S. front was restored, with George Dance, jun.



Guilder. Obverse and reverse of Dutch coin of 1773. Diameter, 3 in.

coined in Florence, and therefore called *fiorino*, or *florin*, it bore at first an impression of S. John the Baptist with a lily. From about 1500 an inferior variety, called a silver guilder, appeared; this remained in circulation in an Austrian as well as a Dutch variety of approximately the

as architect, 1789; complete restoration was not undertaken until 1864, when Sir Horace Jones modelled the open oak roof on that destroyed in 1666, and crowned

the structure with a metal spire. The E. half of the crypt had fine shafts of Purbeck marble and stone vaulting, and when parts of the brick arches of the W. half, put up by Wren, were removed in 1909-10, it appeared that this section was identical with the E. part. The great hall, 152 ft. by 49½ ft., and 89 ft. in height, saw the annual election of the lord mayor and sheriffs and M.P.s for the city, and the state banquets and entertainments of the corporation. The lord mayor's annual banquet began to be held here in 1501.

Guildhall was almost destroyed by fire during the German air raid on London on Dec. 29, 1940. The great hall was left a blackened shell, but was later temporarily roofed and brought into use. While the giant figures of Gog and Magog (*q.v.*) perished, most of the statues and monuments survived. The library was in use again by 1946, but many books were lost. The art gallery of the Corporation of London, founded 1885, was destroyed, as also was the museum, though its exhibits were saved. Consult The Guildhall, J. J. Badderley, 1899.

The Guildhall School of Music was established by the City Corporation in 1880, its building in John Carpenter Street, E.C.4, being opened in 1887.

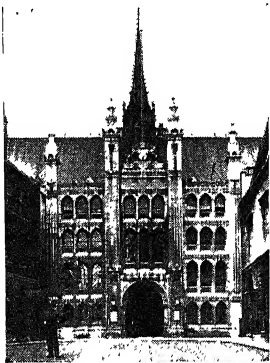
**Guilford, EARL OF.** English title borne by the family of North since 1752. Francis North (1637-1685), a son of the 3rd Lord North, was made Baron Guilford in 1683. He was a prominent lawyer in the time of Charles II, ending with the position of lord keeper of the privy seal. His grandson, Francis, inherited both the barony of Guilford and that of North, and was made an earl in 1752. His son Frederick was Lord North, prime minister of George III, who became earl of Guilford two years before his death in 1792. Frederick, the 5th earl, a great lover of Greece, had much to do with the founding of the university of Corfu. Edward Francis, the 9th earl (born Sept. 22, 1933) suc-

ceeded in 1949. The family seat is at Waldershare Park, Dover, and the title of an eldest son is Lord North. See North, Lord.

**Guillaumat, MARIE LOUIS ADOLPHE** (1863-1940). A French soldier. Born at Bourgneuf, Jan. 4, 1863, he joined the army in 1884 and saw active service in Algeria, Tunisia, Tongking, and China. In the Boxer outbreak in 1900 he commanded the French troops

and measures at Sèvres, near Paris, in 1883. His research work concerned thermophysics, especially heat-resisting alloys, among which "Invar" was his creation. He published a standard work on thermometry in 1889, and improved small-expansion alloys for clocks, scientific instruments, measuring rods, etc. He was made head of the bureau, and in 1920 received the Nobel prize for physics.

**Guillaume d'Orange.** Hero of an old French romance. Also known as Guillaume au Court Nez, or William of the Short Nose. his story is set forth in one of the old *chansons de geste*. The story is



Guildhall, London. The fire-scarred Great Hall, scene of many great civic occasions. The picture shows the scene on May 15, 1947, when the city gave official welcome to the royal family on their return from their South African tour. Top: Exterior of Guildhall, from King Street, before the destructive fire caused by German bombs, Dec. 29, 1940

in Tientsin. Director of infantry under the minister of war in Oct., 1913, he was appointed chief of the cabinet of that minister in June, 1914. He commanded an infantry division in 1914 and the 1st army corps in 1915. As general he took part in the Verdun fighting and was appointed head of the 2nd army, 1916. He succeeded Sarraill as commander-in-chief at Salonica, became military governor of Paris, June, 1918, and commander of the 5th army in Oct. He was at the head of the army of occupation on the Rhine, 1924-30. He died May 19, 1940.

**Guillaume, CHARLES ÉDOUARD** (1861-1938). A Swiss physicist. Born Feb. 15, 1861, at Fleurier, Swiss Jura, descended from generations of watchmakers, he studied physics at Neuchâtel and Zürich, and became a member of the international bureau of weights

blended with that of S. William of Orange, count of Toulouse (d. 812).

**Guillemot** (*Uria*). Genus of seabirds related to the auk and razorbill. The guillemot is common around the British coasts, but is rarely seen on the rocks except in the nesting season, as it is nearly always at sea. The plumage is white on the under parts, with dark head, back, and wings. No nest is made, the single large egg being laid on a bare cliff-edge.

**Guillet's Equivalent.** Term used in metallurgy. Elements may be added to brasses, which



Guillemot. Specimen of *Uria trolle*

are simple binary alloys of copper and zinc, to improve the properties, such as resistance to corrosion, toughness, or strength. Guillet suggested that the added elements could be classified by recording the percentage of zinc that would have to be added to produce the same effect on the structure of the alloy as seen under the microscope. Aluminium is said to have a zinc equivalent of 6, silicon of 10, iron of 0.9, and nickel of 1.2. So 1 p.c. aluminium added to an alloy will produce a similar effect to 6 p.c. zinc; while 1 p.c. nickel added will be similar to a reduction of 1.2 p.c. zinc or an increase of 1.2 p.c. copper. Although the addition of these elements produces similar microstructures to the straight brasses, it does not follow that the same mechanical properties are achieved.

**Guillotine.** An instrument for the painless decapitation of criminals. It consists of two upright

Joseph Ignace Guillotin (1738-1814), who recommended the use of the instrument to the assembly in 1789, and saw it officially adopted by the penal code, 1792. It is still the means of capital punishment in France. The Dr. Guillotine who was beheaded was a different person from the advocate of the instrument.

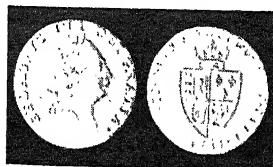
The name is applied in English printing offices, paper warehouses, and bookbinding establishments to a machine for cutting, squaring, and trimming paper.

Guillotine is also used as a political term to indicate the procedure by which the discussion of a measure in parliament is cut short by fixing a day or hour at which the discussion must end.

**Guimaraes.** Town of Portugal, in the district of Braga. It is 36 m. by branch rly. N.E. of Oporto. Its 11th century castle was the birthplace of Alfonso (1094), the first king of Portugal. The 14th century church of Santa Maria da Oliveira is built on the site of an older edifice, traditionally connected with King Wamba (672-680). It has an arcaded town hall. The sulphur springs near the town were the Roman Aquae Laevae. In the neighbourhood is Mons Citania, a prehistoric Iberian city, some ruins of which are still extant. Pop. 9,023.

**Guimard, MARIE MADELEINE** (1743-1816). A French dancer. Born Oct. 10, 1743, in Paris, she became première danseuse at the opera for some 25 years, making her début in 1762 as Terpsichore in *Les Caractères de la Danse*. Her private life was notorious for its extravagance, her liaison with the prince de Soubise lasting many years. In 1772 she opened in Paris the Temple of Terpsichore, notorious for licentious behaviour.

**Guinea.** Obsolete gold coin of the English currency. It was first struck in 1663, deriving its name from the fact that the gold used was imported by a chartered company trading with Guinea, W. Africa. Its nominal value was 20 shillings, but through the rapid depreciation of the silver coinage during the latter part of the 17th century, it rose to be worth as much as 30 shillings by 1694. It sank, however, and in 1717 its value was fixed at 21 shillings. Pieces of  $\frac{1}{2}$ , 2, and 5 guineas were also struck, and in 1718 a  $\frac{1}{4}$ -guinea



Guinea of George III, known as the spade guinea, from the shield. Actual diameter, 1 inch

was coined. The last issue was that of 1813, and in 1817 its place as the standard gold coin was taken by the sovereign (*g.v.*). As a monetary unit, the guinea has survived, and

certain payments, e.g. professional fees, are customarily reckoned in guineas.

**Guinea.** Name applied to a large portion of W. Africa. It covers the territory from the mouth of the Senegal to the S. portion of Angola, and came into general use in the 15th century.

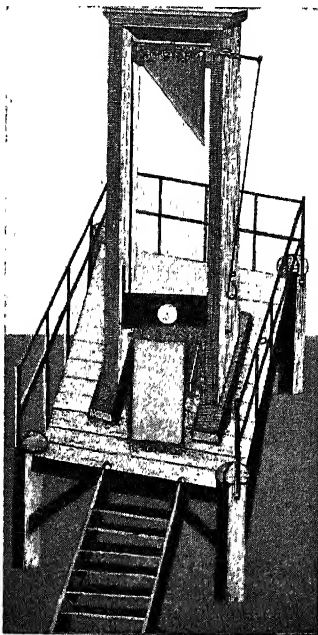
**Guinea, FRENCH.** Overseas territory of France, in W. Africa. It lies between Portuguese Guinea and the British colony of Sierra Leone, by which it is bounded on the N.W. and S.E. respectively. On the N. the French territories Senegal and Sudan, on the S. Liberia, and on the E. the French territory of the Ivory Coast form the boundaries.

Est. area 106,000 sq. m.; est. pop. in 1953 was 2,262,000. The country may be divided into three geographical zones: (1) the flat coastal districts varying in width from 25 m. to 65 m.; (2) a succession of high plateaux culminating in (3) Fouta-Djallon (Futa-Jallon), a mountainous region forming the watershed of the rivers Gambia, Senegal, and Niger. The inhabitants of these regions are generally of mixed origin. The principal tribes are the Diallonkes or Sous-sous, amongst whom Mahomedanism is making rapid progress; the Timenes; and the Foulahs.

The territory is administered by a governor, and a territorial assembly of 50. It is represented in Paris by three deputies and two senators; in the Union assembly by four councillors.

Principal products are ground nuts, palm oil, fruits, gum, timber, rubber, rice, coffee, and there is a large trade in skins and hides, the country being specially rich in cattle, sheep, and goats. The chief towns are Konakry (pop. 38,500), the capital and a port; Kouroussa and Siguri on the Niger; Kankan, Dubreka, Boke, on the Nunez. Konakry is in touch with the Niger by means of the railway at Kouroussa (366 m.) and Kankan (49 m. farther), and thence by waterway to Bamako and the Senegal rly.

**Guinea, PORTUGUESE.** Overseas territory of Portugal, in W. Africa. Except for its very broken



Guillotine used by the French revolutionists in the days of the Terror  
From a contemporary print

grooved posts between which a heavy knife is mounted with its blade set obliquely. When a cord is released the blade falls swiftly on to the block on which the victim's head lies. Similar contrivances existed in Scotland, where the "Maiden" was in use by 1581, and at Halifax, Yorks, before 1650. The present name comes from that of a French doctor,



Atlantic coastline (c. 200 m) it is surrounded by French territory. On the N. is Senegal, on the S. French Guinea. The country is well watered and fertile. Five rivers, the Geba, Mansoa, Cacheo, Buba, and Cachine, are of commercial importance. The people belong to the Foulah, Mandingo, Mam-jak, and other tribes. The principal products are rice, wax, palm oil, and hides. Hard timbers, such as mahogany, camwood, and ebony, are plentiful. Cattle are numerous. Bissao is the capital and chief port; Bolama and Cacheu are other places. The territory, discovered c. 1446, became a colony 1879, an overseas territory 1951. Area 13,948 sq. m. Pop. (1950) 510,777.

**Guinea, SPANISH, OR RIOMUNI.** African colony of Spain. It has French territory to N. (Cameroons) and S. (Gabun) and borders the Gulf of Guinea on the W. In 1935 it was divided into two districts, Fernando Pó, consisting of the island of that name, and Continental Guinea, which includes the islands of Great and Little Elobey. Annobon, and Corisco. Bata is the chief town. The tribesmen include Bengas, Bubis, and Pamwes. Cocoa, coffee, fruits, vegetables, and timber are exported. Area, 10,852 sq. m. Pop. (1950) 198,663 (4,436 white).

**Guinea, GULF OF.** Important gulf in the W. coast of Africa, stretching from Liberia to Cape Lopez in French Equatorial Africa. It is broken by several bays, including the Bight of Benin, the Bight of Biafra, Corisco Bay, and Nazareth Bay, and receives the waters of the Volta, Niger, Ogowe, and other rivers.

**Guinea Fowl** (*Numida meleagris*). Member of the pheasant tribe, of which it is the only repre-



Guinea Fowl. A member of the pheasant tribe

sentative in Africa. In general appearance it is more suggestive of a small turkey than a pheasant. In its wild state the guinea fowl is well distributed over S. and central Africa, but is absent from the northern countries. The birds live in large flocks and run with

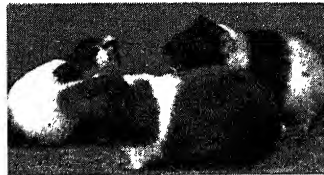
great swiftness, seldom flying unless compelled. They are fond of roosting in low trees where, if disturbed, they give their harsh cries, bowing their heads in rhythm.

The guinea fowl has been domesticated from early days and was highly appreciated by the Greeks and Romans. It is not greatly in favour with modern poultry breeders, as it is somewhat delicate and very quarrelsome.

**Guinea Grass** (*Panicum maximum*). Large perennial grass of the family Gramineae. Native to the W. Indies, it grows from 5 ft. to 10 ft. high.

**Guinea Pepper** (*Xylorhiza aethiopica*). Tall shrub, member of the family Anonaceae, native to W. Africa. It has egg-shaped leaves, covered on the underside with white down, and flowers consisting of three sepals and three petals. The long cylindrical pods have an aromatic odour and a pungent taste, and are used as a substitute for pepper.

**Guinea Pig.** Small domesticated rodent belonging to the cavy tribe, and nearly related to the pacas and



Guinea Pig. Specimens of the rodents often kept as pets

agutis. Its origin is doubtful, but it is believed to have descended from the black Cutler's cavy of Peru, long ago domesticated by the Incas. These cavyes were usually self-coloured, the tortoiseshell coat of the modern guinea pig and the long hair of certain varieties being the result of selective breeding. The guinea pig first appeared in Europe in the 16th century, when it was introduced into the Netherlands not long after the discovery of America. The name Guinea is probably a corruption of Guiana. It is easy to keep in captivity provided it is protected from cold and damp; it will eat most roots and corn; is extremely prolific; and makes good eating.

**Guinea Plum** (*Parinarium excelsum*). Tree belonging to the family Rosaceae, native to W. Africa. It has leathery, oblong leaves, downy beneath, and sprays of white flowers, followed by plum-like fruits with coarse, grey skin, dry, mealy flesh, and a large stone. It is the grey plum of Sierra Leone.

**Guinegate** OR ENGUINEGATTE. A village of France, in the dept. of Pas-de-Calais. Near here the French were beaten by Maximilian of Austria on Aug. 7, 1479; and the battle of the Spurs (q.v.) was fought in 1513. Pop. (1954) 439.

**Guines.** Town of France, in the dept. of Pas-de-Calais, 5½ m. S.S.E. of Calais. Formerly an important place, it had a castle and was a fortified town and the capital of a county to which it gave its name. It is chiefly a market for agricultural produce. The English held it from the time of Edward III to that of Mary I. It was the headquarters of Henry VIII at the Field of the Cloth of Gold (q.v.). Pop. (1954) 4,590.

**Guinevere.** Character in the *Morte d'Arthur*, wife of King Arthur, beloved by Sir Lancelot (q.v.).

**Guinness.** Name of an Irish family famous as brewers. Arthur Guinness, in the 18th century, had a brewery at Leixlip. He transferred his business to Dublin and became famed for his porter, as it was then called. The business was continued by his son, and his grandson, Benjamin Lee Guinness (1798-1868), enlarged it. In 1886, it was made a limited company, the Guinness family retaining a major interest in it. Benjamin Guinness, made a baronet in 1867, was a great benefactor to Dublin. Descendants of his were created earl of Iveagh and Lord Moyne.

**Guinness, ALEC** (b. 1914). British actor with a pleasing, flexible voice, highly expressive face and physique, wit, and keen observation of character who, by his thirties, was able to choose the parts he would play. Born in St. Marylebone, London, April 2, 1914, and educated at Pembroke Lodge, Southbourne, and Roxborough, Eastbourne, he left school at 18 and worked for 18 months in an advertisement agency before studying for the stage. His first professional appearance, a walking-on part in *Libel* at the Playhouse, 1934, was followed by work with John Gielgud's company 1934-36 and 1937-38 and the Old Vic 1936-37, 1938 (when he gave a vital interpretation of Hamlet in a modern dress production), and 1939 during a tour of the Continent and Egypt. He joined the R.N. as a rating 1941, was commissioned 1942, and spent much of the Second Great War in command of a LCI in the Mediterranean.

Guinness played his first film part, Herbert Pocket in *Great*

Expectations, in 1946; his gloating, intelligent Fagin in *Oliver Twist*, 1947.

His playing, 1948, of eight D'Ascoynes in *Kind Hearts and Coronets* showed his astonishing versatility and capacity for being different persons; it was followed by such varied performances as the apparently innocuous bank clerk of *The Lavender Hill Mob*, 1950; absorbed young scientist of *The Man in the White Suit*, 1951; debonair sea captain of *The Captain's Paradise* and *Chestertonian Father Brown*, both 1953; sinister villain of *The Lady-killers*, 1955; bored yet alert Crown Prince of *The Swan*, 1956. Equally varied post-war stage parts included *Harcourt-Reilly* in *T. S. Eliot's The Cocktail Party*, Edinburgh, 1949, and New York 1950; the tragic cardinal in *The Prisoner*, 1954; the would-be erring husband in the farce *Hotel Paradiso*, 1956. Consult A. G., K. Tynan, rev. ed. 1955.



Alec Guinness.  
British actor

**Guinness Trust.** Fund established by the 1st earl of Iveagh in 1889 for the provision of houses for the poorer classes in London and Dublin. The sum set aside was £250,000, later increased; and blocks of dwellings were erected. The offices of the trust are 11, St. James's Square, London, S.W.1.

**Guipure.** Lace-making term. The word is French, from *guiper*, to whip, or cover, a thread, and originally denoted the silk-whipped cord or wire used in lace-making. It was also applied to the cartisane of parchment lace, i.e. to the small pieces of parchment or vellum whipped round with gold or silver thread, and eventually to the lace itself; and the name was also used of imitation parchment lace. The term is applied generally to lace with no mesh ground, with the patterns tied with brides or large stitches, e.g. Honiton and Maltese lace; to lace made with gimp; and to some kinds of gimp.

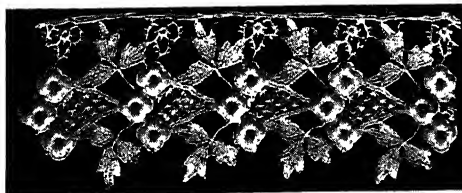
**Guipúzcoa.** Maritime province of N. Spain. The Bay of Biscay washes its N. shores, and the river

Bidasoa separates it from France on the N.E. One of the Basque provinces, it is the smallest in the country but nearly the most densely populated; its area is 728 sq. m. Pop. (1950) was 374,040 (513 to the sq. m.). There are pine, oak, and chestnut forests, and fruit orchards. Mineral springs abound; cod, tunny, and sardine fisheries are important, and oysters are bred. The capital is San Sebastian.

**Guiraut de Borneil** (c. 1138–1220). Provençal troubadour. He was born at Excideuil, Dordogne, and accompanied Richard Coeur de Lion on the third crusade. Though known as "master of the troubadours," he has received but scant attention from students, only a portion of the eighty of his poems which survive having been edited, by A. Kolsen, 1894.

**Guisborough.** A market town and urban district of the North Riding of Yorkshire, England. It is 9 m. E.S.E. of Middlesbrough, in a valley beneath the Cleveland Hills. The chief buildings are the church of S. Nicholas, a Perpendicular edifice, the town hall, and the grammar school. Here was an Augustinian priory, some few remains of which still exist; it is said to have been founded c. 1109 by one of the Bruce family. Industrial works include a steel foundry and a clothing factory. Market, Tues. Pop. (1951) 9,212.

**Guiscard, ROBERT** (c. 1020–85). Norman warrior. Born near Coutances, he was a younger son of Tancred de Hauteville. About 1046 he went to Italy, whither his elder brothers had preceded him, they being among the Normans who had just taken Apulia from the Greeks. Three of them were chosen in turn count of Apulia.



Guipure. Example of the lace of this name

and to this office, 1057, Robert, who had also made a name as a warrior, succeeded. He continued the Norman work of conquest and was recognized as a duke by the pope. In 1081 he led an army to Greece, and defeated the Byzantine emperor's troops at Durazzo, returning to Italy to help Pope Gregory VII, then at war with the emperor Henry IV. Guiscard

drove Henry's troops from before Rome, to which he restored Pope Gregory. He renewed war against Byzantium, but died at Cephalonia, July 17, 1085. The name Guiscard means resourceful.

**Guise.** Town of France, in the dept. of Aisne. It stands on the Oise, 30 m. N. of Laon. The castle dates in part from the 16th century. About 1850 J. B. Godin founded here a works making stoves and other iron goods and conducted cooperatively in accordance with the principles of François Fourier; in connexion with them there was a large building where the workmen lived communally. Camille Desmoulins was a native of Guise. The French dukes of Guise took their name from the town, which in the Middle Ages was the capital of a county. The battle of Guise or of St. Quentin was fought in the First Great War, Aug. 29–30, 1914. The French 5th army, under Lanrezac, was preparing an offensive against St. Quentin when it was itself attacked. Two corps diverted to deal with this attack drove the Germans back across the Oise; but on Aug. 30 Lanrezac, his flanks unsecured, had to break off the engagement. Guise fell to the Germans the next day, and was not recovered until Oct., 1918. Pop. (1954) 6,091.

**Guise, DUKE OF.** French title held by a cadet branch of the ruling family of Lorraine. The earldom of Guise, with Aumale, Elbeuf, and other possessions, was brought to Rudolph of Lorraine by his wife Marie of Blois in 1333. In the hands of his grandson Claude it was converted into a duchy. Mary of Guise, also known as Mary of Lorraine (1515–60), was wife of James V of Scotland and mother of Mary Queen of Scots. The last duke died in 1675, and the title lapsed on the death of his great-aunt Marie. It was revived for Jean, son of Robert, duke of Chartres (1874–1940), who on the death in 1926 of the duke of Orleans, became pretender to the throne of France. Exiled under republican law, he lived for many years near Brussels. He died Aug. 25, 1940. See under Bourbon.

**Guise, CHARLES DE** (1525–74). French prelate, called the cardinal of Lorraine. The 2nd son of Claude duke of Guise, he was made titular archbishop of Reims, 1538, and cardinal in 1547. Unscrupulous, but skilled in statecraft, he shared for many years the power of his brother Francis, 2nd

duke of Guise. He helped to negotiate the treaty of Cateau-Cambrésis, 1559, and, as a bitter foe of the Huguenots, strove to intensify the Inquisition in France. Forced to leave court by Catherine de' Medici, he died in disgrace Dec. 22, 1574. He is sometimes confused with his dissolute younger brother Louis, also a cardinal, known as "cardinal of the bottles."

**Guise, CLAUDE, 1ST DUKE OF** (1496-1550). A French soldier. Second son of René II, duke of



1st Duke of Guise  
From a portrait in the  
Pitti Palace, Florence

Lorraine (d. 1508), he was born Oct. 20, 1496. He inherited his father's French duchy of Aumale, his brother Anthony succeeding to the dukedom of Lorraine. In 1513 he married Antoinette of Bourbon, thus linking himself with the French court, where he became an official of the household. He fought with great gallantry at Marignano, 1515, and at Fuenterrabia, 1521. In 1525 he shattered the Anabaptist forces in Lorraine. Francis I of France made Claude governor of Champagne, and converted his fief of Guise into a duchy, 1526. He was thus a peer of France, and by Angevin descent and his Lorraine duchy took precedence over the Bourbon princes themselves. He died April 12, 1550.

**Guise, FRANCIS, 2ND DUKE OF** (1519-63). French soldier and statesman. He was born at Bar, Feb. 17, 1519, and saw war at Montmédy, in 1542; Landrecies, in 1543; and at the siege of Boulogne, in 1545, his wounds in these campaigns giving him the sobriquet of *Le Balafre*, the scarred. His defence of Metz against the emperor Charles V, 1552, made him famous as a general, and he commanded the French troops sent to aid Pope Paul III against Spain, 1556. In 1558 he recovered Calais and other places from the English.

Under Francis II the duke was virtually supreme ruler of France. With relentless cruelty he suppressed the conspiracy of Amboise formed by the lesser nobility against the rule of the Guises and their ally the cardinal Granvelle, 1560. Under the regency of Catherine de' Medici he formed, with the duke of Montmorency and the marshal de S. André, the "triumvirate" who opposed her attempts to reconcile the Catholic

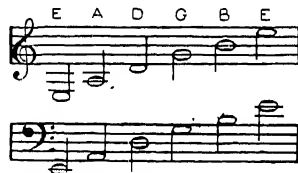
and Protestant parties. In the religious wars which broke out in 1562, Francis again took the field, winning victories at Rouen and Dreux, 1562, but while laying siege to Orléans was shot at St. Mesmin by a Protestant fanatic, Feb. 19, 1563, and died five days later.

**Guise, HENRI, 3RD DUKE OF** (1550-88). Son of Francis of Guise. Born Dec. 31, 1550, he inherited his father's courage but not his ability. He fought against the Turkish invaders of Hungary, was prominent in the massacre of S. Bartholomew, 1572, and defeated the Huguenots at Dormans, 1575. He set out in 1585 to use his great popularity to seize the crown from the discredited Henry III.

Defeating the German mercenaries at Vimory, and the Huguenots at Auneau, 1587, Guise entered Paris and, the Parisian mob favouring his attempt, laid siege to the king in the Louvre. After the Day of the Barricades, May 12, 1588, he might with more resolution have grasped the crown. But Henry III left Paris for Blois, where he invited Guise to attend the states-general which he convoked. The duke followed the king to Blois, but was assassinated there by the king's arrangement, and almost in his presence, Dec. 23. Like his father, Henri was called *Le Balafre*, from a wound received at Dormans.

**Guise, HENRI, 5TH DUKE OF** (1614-64). Born at Blois, April 4, 1614, son of Charles of Lorraine, 4th duke of Guise, he became archbishop of Reims. On his father's death, 1640, he renounced his orders and took the title. He conspired with the count of Soissons against Louis XIII, 1641, and with Masaniello in 1647 to seize the crown of Naples. Taken prisoner in the attempt, he was confined in Spain, 1648-52, but then joined the Frondeurs in Paris.

**Guitar** (Greek *kithara*, Lat. *cithara*). Stringed instrument, with a neck and fretted fingerboard. The true Spanish guitar has six strings, played by plucking with the fingers, usually tuned:—



Many other forms and sizes, tried during the last three centuries, may be seen in museums.

**Guitry, LUCIEN** (1860-1925). A French actor. Born in Paris, Dec. 13, 1860, he first appeared



Lucien Guitry,  
French actor  
Gerschel

at the *Gymnase in La Dame aux Camélias*, 1878. He spent some years at St. Petersburg (Leningrad), was producer at the *Comédie Française*, but became best known by his successful managership of the *Théâtre de la Renaissance*, 1902-09. Among his most successful performances there were in Anatole France's *Crainquebille* and *Le Mannequin d'Osier*, Zola's *L'Assommoir*, and in *L'Emigré* and *Le Juif Polonais*. He appeared in London in 1902, 1909, 1920 and died June 1, 1925.

**Guitry, SACHA** (1885-1957). A French actor and dramatist. Son of Lucien Guitry, he was born at

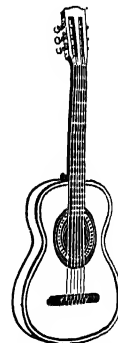


Sacha Guitry,  
French actor  
and dramatist

St. Petersburg, Feb. 21, 1885, and went to a series of schools in Paris until, at 16, he started to write plays. He wrote more than 100—the majority light, witty, sophisticated comedies, e.g. *Nono*, 1905; *La Clef*, 1907; *Beau Mariage*, 1912; *Mon Père avait raison*, 1919; *Un Sujet de roman*, 1923; *Quadrille*, 1938; *Tu m'as sauvé la vie*, 1950. His father acted in some of his plays, and he himself acted in most of them; he also managed various famous theatres: *Edouard VII*, *Variétés*, *Sarah Bernhardt*, etc. In films from 1935 he wrote, played in,

and directed some brilliant satires, e.g. *Le Roman d'un tricheur*; *Les Perles de la Couronne*. A charge made against him of collaboration with the Germans during the occupation was withdrawn. He died in Paris, July 24, 1957. Yvonne Printemps (q.v.) was the second of his five wives.

**Guittone di Arezzo** (c. 1235-94). Italian poet. One of the most influential fore-



Guitar. Andalusian model

runners of Dante, he is credited with having first given the sonnet its enduring form, and with being the author of the first known Italian epistolary writings. He is frequently referred to as Fra Guittone, having joined the military and religious order of the Cavalieri de Santa Maria.

**Guizot**, FRANÇOIS PIERRE GUILAUME (1787-1874). French politician and historian. Born at Nîmes, Oct. 4, 1787, of Huguenot parentage and brought up at Geneva, he went to Paris in 1805 to study law. While there he attracted attention by journalistic writings, and in 1812 was appointed professor of modern history in the University of France. Under Louis XVIII he held several administrative offices and became leader of the moderate Liberals; but the reactionary policy of Charles X drove him into opposition, and for some time his lectures were interdicted.

Under Louis Philippe from 1830 Guizot was almost continually in office. He moved towards a rigid Conservatism, but it was his law which in 1833 established primary education. In 1840 he was sent as French ambassador to London, but remained in England only a few months, being recalled by the king to take Thiers's place as foreign minister. His pacific policy maintained good relations with England, but at home—in 1847 he became prime minister—his refusal to yield to popular demands brought about the revolution of Feb. 23, 1848, which virtually closed his political career. The rest of his life was devoted to literature. He died at Val-Richer, Normandy, Oct. 12, 1874.

Guizot's *Histoire de la Révolution d'Angleterre*, *Histoire de la Civilisation en Europe*, and *Histoire de la Civilisation en France*, are carefully written, philosophical in character, and impregnated with his own political ideas. G. Bardoux published a life of Guizot in 1894. *Pron.* ghee-zo.

**Gujarat**. A region of the state of Bombay, India, lying north of the Narbada river and east of the Rann of Cutch. It is a fertile plain, with plentiful rainfall. The Gujarat States political agency comprised Balasinor, Bansda, Baria, Cambay, Chota Udaipur,

Dharampur, Jahwar, Lunawada, Rajpipla, Sachin, Sant Jambughoda, Surgana, the Dangs, and the estates of Vatrak Kantha Thana. They came under the govt. of India in 1933, when the Baroda and Gujarat States agency was formed. This was amalgamated with the Western Indian States agency in 1944, the combined agency maintaining a resident for the Gujarat states at Bulsar. In 1948 the Gujarat states were merged in Bombay.

**Gujarat**. District, subdivision, and town of the Rawalpindi division of W. Pakistan. The district lies in Punjab, between the Jhelum and Chenab rivers, and is irrigated from the Jhelum canals. Wheat is the principal crop. Gujarat town makes furniture. District: 2,051 sq. m., pop. 850,000. Subdivision: 569 sq. m., pop. 350,000. Town, pop. 35,000.

**Gujarat, BATTLE OF**. Fought between the British and the Sikhs, Feb. 21, 1849. The second Sikh War had begun with the British check at Chillianwalla, in Jan. In Feb. Lord Gough, the British commander, fought an army of Sikhs, estimated at 60,000, drawn up before the fortified town of Gujarat. He attacked them with his artillery, in which he was greatly superior, allowing this to play upon them for 2½ hrs. An advance was then made, and the Sikh ranks broke into flight. The British cavalry pursued them for miles. The Sikh army was annihilated and its guns were captured. The British army of 24,000 lost about 800. Gujarat was taken and the Punjab surrendered.

**Gujranwala**. Dist., subdivision, and town of W. Pakistan, in the Lahore division. The dist., area 2,311 sq. m., was awarded to Pakistan by the boundary commission in 1947; about two-thirds is under cultivation, one-third of this being devoted to wheat; other crops are gram, barley, cotton, and millet. The district owes much of its prosperity to the two Chenab irrigation canals.

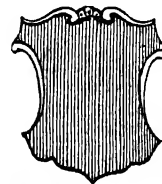
Gujranwala town is an important commercial centre; its manufactures include cotton cloth and brass vessels. Jats are the most numerous tribesmen. Pop. (1951) 120,860.

**Gulbarga**. District and town of Mysore, India, formerly in Hyderabad. Area of district, 6,719 sq. m. Millet is the chief crop; limestone occurs; cotton goods are made; and millet, hides, and cotton exported. Imports include salt, cotton, woollens, and

hardware. In Gulbarga city, a trading centre, is the Jama Masjid in the old fort, a mosque constructed in the time of Ferozeshah. Pop. (1951) dist., 1,448,944; town, 77,189.

**Gulbenkian Foundation**. Trust set up in 1956 under the will of Calouste Sarkis Gulbenkian (1869-1955). An Armenian born a Turkish subject and naturalised as British in 1902, he made an immense fortune (sometimes estimated at £300,000,000) out of petroleum dealings, the bulk of which he left for the establishment of a foundation whose purpose was to assist, on an international basis, artistic, scientific, educational, and charitable objects. The initial income of the foundation exceeded £5,000,000 a year. Its headquarters was established at Lisbon, Portugal, in which country Gulbenkian spent the last years of his life. Early beneficiaries included certain schools in the U.K. The trustees were concerned specially with the Middle East, Armenia, and the British Commonwealth. *Consult* Mr. Five Per Cent (biog. of Gulbenkian) R. Hewins, 1957.

**Gules**. One of the seven heraldic tinctures, red. It is represented in drawings by a series of thin vertical lines close together. The word is derived from either Fr. *gueules*, pl. of *gueule* (Lat. *gula*), throat, red skin, or Persian *gyul*, rose.



Gules as represented in heraldry

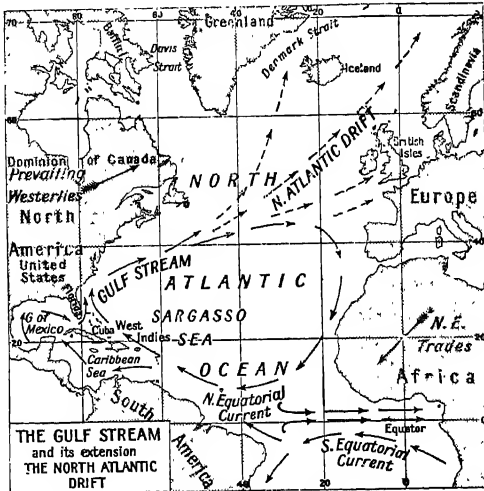
**Gulf Stream**. Warm ocean current flowing from the Gulf of Mexico along the S.E. coast of the U.S.A. The N.E. trades cause a great drift of waters—the N. Equatorial current, from E. to W. across the Atlantic Ocean N. of the equator. Part of this current skirts the outer shores of the W. Indies, but the greater portion enters the Caribbean Sea and thence passes to the Gulf of Mexico. Here the piling up of waters causes a stream current to issue from the Gulf of Mexico between Florida and Cuba. This current unites with the branch which keeps outside the W. Indies to form the Gulf Stream.

The combined current follows the direction of the coast; it decreases steadily in rate of flow, depth, and temperature, but increases in width. On reaching the latitudes of the prevailing westerlies the Gulf Stream loses its character and becomes a great

drift. Its waters are spread out like a fan, and, instead of there being a broad ocean river, there is a general movement of the whole surface waters of the ocean which, pushed by the winds, drift towards the coasts of N.W. Europe. This drift current is called the Gulf Stream drift or the N. Atlantic drift.

Off the American continent the Gulf Stream is strongest in spring and summer, flowing at 30 m. a day; the trans-Atlantic current is only about one-seventh as fast. The amelioration of the climate of W. Europe is due to the prevailing W. and S.W. winds, not directly to the Gulf Stream, although an extension of the latter across the Atlantic is caused at the same time.

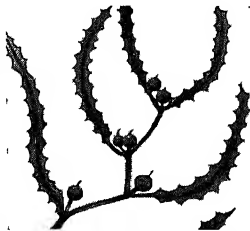
**Gulfweed** (*Sargassum bacciferum*). A seaweed of the class Phaeophyceae. It has narrow, stalked leaves, with stalked airbladders at their base. It floats on the sea, forming vast fields that impede shipping. Detached pieces are often deposited on distant shores by the Gulf Stream. Its celebrated headquarters is in the Atlantic, where it is estimated to cover an area of 200,000 sq. m., known as the Sargasso Sea, and almost unaltered since the days when Columbus encountered it about 400 leagues to the W. of the Canaries, to the great alarm of his



Gulf Stream. Chart of the North Atlantic Ocean showing the origin and directions of the current

men, who imagined it to be attached to submerged rocks.

**Gull.** Sub-order (*Lari*) of seabirds, comprising about 50 species. It includes the various genera commonly known as gulls, terns, kittiwakes, and skuas. Most are grey and white in colour, have long and powerful wings, and are web-footed. All are fine swimmers and fliers, and many of them divers. The majority haunt the coasts, usually in flocks, but are frequently found far inland during severe weather. Gulls are often seen following the plough in search of grubs, and the assemblage of vast flocks of black-headed gulls is a common sight in London during winter. When at sea they feed on



Gulfweed. Leaves and fruit of the Sargasso Sea seaweed

fishes and small crustaceans

Gulls are all migratory, either wholly or partially. Their large eggs, of which they lay usually two or three a season, are in many places collected for the table.

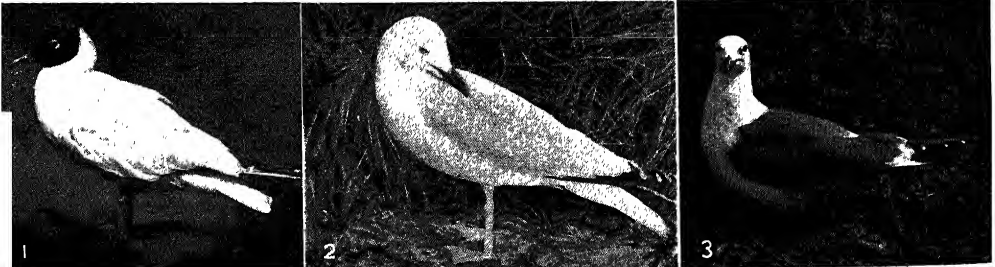
Most gulls nest on the cliffs; some, as the black-headed gulls, in the marshes. Voracious feeders, eating almost anything, to break mussels they will carry them aloft to drop them on the rocks.

Among the more familiar species are the common gull, which is really less common than many others, and visits England only in winter; the black-headed gull, which is common around the coasts, has a red beak, and develops a dark-brown head and neck in summer; and the herring gull, a large bird measuring nearly 2 ft. in length, which has a yellow beak, red legs, and yellow rings round the eyes. See Bird.

**Gullet** (Lat. *gula*, throat). Tube leading from the pharynx to the stomach through which food passes. See Oesophagus.

**Gulliver's Travels.** Satiric work of fiction by Jonathan Swift, parts of which have gained later popularity as a children's story. It was first published pseudonymously in 1726 as *Travels into Several Remote Nations of the World by Lemuel Gulliver*. It is divided into four parts, telling of as many voyages; to Lilliput and to Brobdingnag, in both of which the satire is political; to Laputa, satirising philosophers and men of science; and to the Houyhnhnms, where the satire degenerates into misanthropy. Apart from the satire, this work is one of the most original and convincing works of extravagant fiction. The idea is borrowed from the *Vera Historia*, or *True History*, of Lucian (*q.v.*), which also inspired Cyrano de Bergerac's *Voyage à la Lune*. See Brobdingnag; Lilliput; Houyhnhnms; Swift, Jonathan.

**Gullstrand, ALLVAR** (1862-1930). Swedish physician. Born at Landskrona, June 5, 1862, he became professor of diseases of the eye, 1894, and of physiological and physical optics, 1913, in the university of Uppsala, where he engaged in valuable researches on dioptrics. He died July 28, 1930.



Gull. 1. Black-headed gull, common around the coasts, has a red beak. 2. Herring gull, large bird with yellow beak, a typical British coastal species. 3. Black-backed gull, a highly predacious bird, also seen on the coasts of Great Britain

**Gully, JOHN** (1783-1863). British sportsman. Born at the Crown Inn, Wick, of which his father was the proprietor, Aug. 21, 1783, he was brought up as a butcher. While imprisoned for debt in the Marshalsea he made the acquaintance of the Game Chicken, the prize-fighter, who obtained his release by interesting some patrons of the ring. Gully fought in the ring till 1808, then became a professional betting man and amassed a large fortune, which he invested in collieries. He won the St. Leger with Margrave in 1832, pulled off the double at Epsom in 1846 with Pyrrhus I (Derby) and Mendicant (Oaks) and in 1854 won the 2,000 Guineas with Hermit (not the Derby winner of 1867) and the Derby with Andover. Gully represented Pontefract in parliament, 1832-37. He died March 9, 1863. *Consult* Life and Times, B. Darwin, 1935.

**Gum** (*Eucalyptus*). Large genus of tall evergreen trees of the family Myrtaceae. With few exceptions they are natives of Australia, where they are the dominant trees of the forests. They have undivided, leathery, and usually alternate leaves. The upper part of the calyx and the corolla are shed when the flower opens, so that the great number of stamens form the most conspicuous feature of the expanded blossom. *Eucalyptus* oil is obtained from the leaves of *E. globulus*, the blue gum.

Some species rapidly attain enormous proportions, the height frequently exceeding those of the giant sequoias of California. *E. amygdalina* has been recorded of the height of 522 ft. The girth of these big trees at 5 ft. from the ground averages from 40 ft. to 50 ft., though they have been 88 ft. Planks over 200 ft. long have been cut from them. Some species shed the outer bark in long thin strips; but the under bark is deliberately stripped for roofing houses and many trees are killed by this process. Fallen timber rapidly decays. Among other products of the gum trees is a kind of kino, which exudes from the tree as a resinous juice, and has great astringent properties. The timber is valuable for many purposes, especially where beams of great length are required.

**Gum** (Lat. *gummi*). Substance which with water yields a sticky adhesive solution or a thick mucilage. Most natural gums are spontaneous exudations from trees, and are insoluble in organic solvents, e.g. turpentine, alcohol.

Chemically they are related to the carbohydrates (sugars). The chief is gum arabic, obtained from various species of *Acacia*, by far the most important being *A. senegal*, which grows in Africa from Nigeria to the Nile and as far S. as Natal. The chief resin collecting areas are French Senegal and the Sudan, where the trade is well organized and the trees are tapped systematically. Gum has been obtained from Sudan since very early times and records of its collection and use are found in The Book of the Dead (*q.v.*). Other species of tree yield similar but generally inferior gums. The best



Gum arabic, flowers of *Acacia senegal*

grade of gum arabic known as Kordofan. Gum arabic dissolves in water, giving clear viscous solutions used as adhesives, and also in confectionery and the finishing of textiles. Gum tragacanth (gum dragon) is typical of the gums which swell up and yield thick mucilages with water. It is obtained from various species of *Astragalus*, the chief being *A. gummifer*, a shrub which grows in Asia Minor, Turkey, and the uplands of Persia. When the stem is cut, the gum exudes and dries in the form of thin flakes. Gum tragacanth is used in medicine, in the manufacture of sauces, chutneys, etc., and in textile finishing. Various other gums are obtained and sometimes appear mixed, either intentionally or accidentally, with arabic and tragacanth. Some of these, e.g. gum karaya, one of the Sterculin gums, are not regarded as adulterants; others are, e.g. gum ghatti, which is less soluble than arabic, and hog tragacanth, an inferior type of tragacanth. Hog tragacanth comes from a species of *Prunus*. Many trees of the Sterculia species yield a gum somewhat resembling tragacanth, but of inferior quality.

In addition to gums collected as exudations from trees, an important gum, gum tragasol, is extracted from the seeds of the carob or locust tree, *Ceratonia siliqua*; it resembles tragacanth and is used in textile dyeing and finishing.

Of manufactured gums, dextrin or British gum is the most important. It is in some respects superior to gum arabic as an adhesive, especially where mechanical application, e.g. in the case of

postage stamps, is necessary. In commerce, the term gum is often incorrectly used to include resins. *See* Resin.

**Gum** OR GINGIVA. Name for the fleshy tissue which surrounds the margin of the upper and lower jaws. The gums are covered by mucous membrane which is continuous with that of the mouth. Inflammation of the gums may arise from neglect of the teeth, allowing of invasion by micro-organisms. It is also seen in scurvy and when there is a lack of Vitamin C. The presence of tartar and red swollen gums indicates that of infection, the source of which may need to be determined by dental X-rays. Chronic inflammation of the gum may eventually lead to loosening and falling out of the teeth. An abscess at the root of a tooth may break through on the surface of the gum, the condition being known as a gumboil.

Pyorrhoea alveolaris is an inflammatory state of the gums associated with the formation of pus between the teeth and the gum. The condition is apt to affect the general health, being associated with anaemia, disorders of digestion, and rheumatism. In chronic cases the teeth often become loose. Reflex salivation may be present and much mucus is secreted by the glands of the mouth. Bad breath and an unpleasant taste in the mouth result from decomposing food and the pockets of pus. Treatment, to be carried out under expert advice, consists in high vitamin intake, stimulation of the gums, and strict oral hygiene; penicillin has also been found helpful in some cases. If the condition is severe, removal of the teeth may be necessary.

**Gumbo** OR OKRA (*Hibiscus esculentus*). Annual herb of the family Malvaceae. It is a native of the W. Indies, and has yellow flowers. The unripe fruits contain much mucilage, and are used in cookery for thickening soups, and for other purposes.

**Gumboil**. Small abscess on the gum, arising usually from decay of a tooth. *See* Gum.

**Gumma** (Plural gummata). Lesion which may form in almost any organ or tissue of the body during the later course of syphilis, yaws, and tubercle.

**Gummidge**, Mrs. Character in Dickens's *David Copperfield*. She is the widow of Daniel Peggotty's partner, and, given a home by that generous man, takes the most



comfortable place and querulously complains that she is a "lone, lorn creetur, and everythink goes contraiy with her."

**Gumming.** Disease or affection of fruit trees usually due to excessive richness in the soil. It manifests itself by exudations of a yellowish-brown transparent substance upon the stems or joint branches of the trees. Trees so affected should either be transplanted into a less fertile soil or rigorously root-pruned. As a rule, gummy trees run to an excess of foliage without making much fruit. The condition may also be a response to disease, such as silver leaf of plum trees, where it is a protective device to isolate diseased tissues.

**Gumti.** River of India, in the Uttar Union. It rises east of Pilibhit, and after a course of about 500 m. enters the Ganges at Saidpur, in Ghazipur district. The Gumti is the only left bank tributary of the Ganges which does not issue from the Himalayas; it depends for its water entirely upon the rains. Lucknow is the chief town on its banks.

**Gumurdjina, GUMURZHINA, OR GUMULJINA.** Town of Greece, in Thrace. Known chiefly for its large annual cattle market, it is situated on the Karaga, about 70 m. S.W. of Adrianople, and 12 m. from the Aegean Sea. The district produces good wine.

**Gun** (A.S. *gonne*, machine for throwing missiles). Term loosely employed to describe several widely different varieties of firearms and, more particularly, relatively long-barrelled varieties. Among smaller firearms, the term gun is chiefly confined to long-barrelled, smooth-bore sporting weapons and the automatically operated rifles termed machine-guns. Among larger firearms, gun is the designation of the long-barrelled rifled weapons, which, on account of their stronger construction, permitting higher chamber pressures, and consequently greater muzzle velocity of the projectile, are able to throw the latter a greater distance with a comparatively flat trajectory in contradistinction to the more lightly constructed howitzers, which, though they may throw a projectile of equal or greater weight for similar calibres, work at a lower pressure, have a shorter range, and attain this by a steep or high trajectory. Howitzers are usually rifled, but many introduced to aid trench fighting in the First Great War were smooth bored.

The early history and development of the sporting gun is the same as that of the military weapon, and it was not until it was recognized, towards the middle of the 19th century, that a rifled weapon was essential for military purposes, that the two classes became distinctive. Modern sporting guns throw a charge of small shot to an effective range of 50 to 90 yards, the barrels being smooth bored. If the bore is parallel throughout it is known as cylinder, but if it is constricted towards the muzzle in order to increase the effective range and prevent the shot spreading so widely it is termed choke (half or full). Most guns are double barrelled, and except for special purposes it is usual for the right barrel to be cylinder and the left choke bored. The size of the bore is designated by a number, this being a survival from the days of the musket and founded on the weight of the single lead bullet which the barrel was designed to use. The most usual size is 12 bore, but 8 or 4 bore guns are employed for duck shooting, and 16, 20, and 28 bore guns when an exceptionally light weapon is desired.

The question of weight has always been important in the manufacture of sporting weapons, it being essential to attain the maximum strength with the minimum weight. Barrels were for years constructed of strands of wrought iron and steel twisted and then welded together (Damascus barrels); but the type is now chiefly valued for the beauty of the etched surface, as modern alloy steels provide ample strength and toughness.

All modern weapons are breech-loading and employ central fire cartridges. In some guns the striking mechanism is external (hammer guns), while in others the striking mechanism is enclosed in the lock, giving a neater appearance (hammerless). Some of the latter class, known as ejectors, automatically throw out the empty cartridge case after a shot has been fired, and a further development is the single trigger gun in which one trigger controls both barrels. Single-barrel repeating and automatic guns carrying five to eight cartridges in a magazine have also been introduced, but are too heavy to be popular. To give some measure of safety where it is necessary to carry the weapons loaded, hammer guns can be placed at half cock, and the hammerless variety have a safety catch.

In the highest-class guns specially well-figured walnut is employed for the stocks, and the greatest skill is lavished on elaborate engraving of the lock plates and breech block. English guns have the highest reputation for beauty and accuracy of workmanship, while Belgian guns supply a more popular demand. After 1918 the Birmingham Small Arms co. instituted a policy of mass production of plain finished, reliable guns at a competitive price. Before any gun is purchased it should be submitted to a firing proof for strength as evidenced by a proof mark stamped on the barrels, while smokeless powder cartridges should not be used in any gun which has not been tested for the higher pressures involved and does not bear the stamp "nitro proof." See Artillery; Bore; Bullet; Calibre; Firearms; Guns and Gunnery. Naval; Machine-Gun; Rifle.

**Gunboat.** Term usually applied to small craft capable of operating in shallow waters and limited areas, and in which the gun assumes an importance disproportionate to the size of the vessel. In the days of sail, a gunboat was usually a small coast defence vessel, often furnished with sweeps to enable her to take advantage of an opponent becalmed in sight of land.

In the British Navy recently there have been three types of gunboat: (1) River gunboats, originally designed for service on the Yang-tse and other Chinese waterways; in size these have varied from 700 tons, with an armament of two 4-in. guns, one 3·7-in. howitzer, and a dozen smaller weapons, to 185 tons, armed with one 3·7-in. howitzer and nine smaller pieces. (2) Motor gunboats, employed during the Second Great War against enemy coastal traffic in the North Sea and English Channel; ultimately there were two main types, of 72 and 60 tons respectively, with speeds of 25-26·5 knots, and armaments of 40-mm., 20-mm., and machine-guns. (3) Steam gunboats, with the same purpose but of greater size and speed (250 tons and over 30 knots).

In the U.S. and Netherlands navies the term gunboat has been applied to a vessel which would be classified as a sloop in the Royal Navy. The Brazilian navy possesses specially designed gunboats for duty on the Amazon, varying in size from 620 to 190 tons.

**Guncotton.** Nitrocellulose of a high degree of nitration, containing 13-13½ p.c. of nitrogen. Cotton

waste is the raw material generally employed in the manufacture of guncotton. It is given a drastic treatment with alkali to remove all grease, boiled with several changes of water, dried, picked over by hand to remove impurities, opened out by a teasing machine, and then desiccated. The nitrating acid contains about 75 p.c. sulphuric acid, 17 p.c. nitric acid, and 8 p.c. water, the proportions varying according to the process. When nitration is complete the guncotton is immersed in water and thoroughly washed to remove the bulk of the acids, and then undergoes stabilisation to remove products, which, if left in, would have a deleterious effect on its keeping properties.

Stabilisation implies boiling the guncotton in about 10 series of waters, a trace of alkali being sometimes added, the total boiling lasting about 50 hours. Passing the guncotton through a pulping machine reduces it to a fine state of division; it is then passed over a trap to remove foreign matter, and then washed again in a poacher, a small percentage of calcium carbonate added, and then the water content reduced to about 25 p.c., and the pulp moulded into blocks by hydraulic pressure.

Wet guncotton is insensitive and a satisfactory blasting explosive if primed with dry guncotton initiated with a fulminate detonator. At one time it found extensive use for filling mines, torpedoes, etc., but has been displaced by trinitrotoluene, and at present is only employed for military blasting, being pressed into 15 oz. slabs. In the dry state guncotton is sensitive to friction and percussion, and must be handled with great care. In this condition it is used for priming wet guncotton. It also makes smokeless powders. *See Explosives; Nitrocellulose; Smokeless Powder.*

**Gundulph** (c. 1024–1108). A Norman bishop and architect. Born near Rouen, he was educated there and became a clerk of the cathedral. He then accompanied William, archdeacon and later archbishop of Rouen, on a pilgrimage to Jerusalem, and on his return in 1060 became a monk of Bec. When the prior of Bec, Lanfranc, was appointed abbot at Caen, Gundulph went with him, and in 1070 followed Lanfranc to the see of Canterbury as his steward. From 1077 to 1108 Gundulph was bishop of Rochester. He reestablished the chapter as a monastic body, and rebuilt the cathedral. He was also the

architect of the White Tower, in the Tower of London, and of S. Leonard's Tower, W. Malling, and other buildings. During 1089–93, he acted as archbishop of Canterbury between the death of Lanfranc and the appointment of Anselm. He died March 7, 1108, and was buried at Rochester.

**Gunjah** OR GANJA. Dried flowering tops of the female plants of Indian hemp. *See Ganja.*

**Gun Licence.** Permit necessary for the possession of firearms. In Great Britain the licence, which is administered by the county councils and is rigidly enforced, permits the owner to carry firearms. It costs 10s. a year, and expires on July 31. Soldiers carrying rifles or revolvers in the performance of duty, are exempt, as are also holders of game licences. The possession of a gun licence does not absolve the owner from the necessity of applying for a police permit to possess firearms. *See Firearms.*

**Gunmakers' Company.** London city livery company. It was granted a charter in 1637 for the



Gunmakers' Company arms

purpose of compelling the proof and marking by the company of the barrels of certain small arms before sale. By the Gun Barrel Proof Act, 1868, the charter was recognized and it was made obligatory for the barrels of small arms (with certain exceptions) to be proved and marked either by the company or by the guardians of the Birmingham proof house. The proof house is at 48–50, Commercial Road, London, E.1.

**Gunmetal.** An alloy of copper and tin, with smaller amounts of zinc and lead, containing 85–90 p.c. copper. It thus belongs to that class of alloys known as bronzes. It was long the chief metal used in the making of cannon, its place now being taken by steel. Possibly the Chinese prepared gunmetal and used it in making ordnance long before any other people; the Arabs prepared such cannon at the beginning of the 12th century; and cannon used by the Turks at the siege of Constantinople in 1394 may have been of this alloy. Gunmetal makes parts of machinery which require great strength but for which steel or iron cannot be employed, as in certain classes of pumps, and for the bearings of heavy shafts. *See Alloys; Bronze.*

**Gunn.** Name of a family of English cricketers. They all played

for Nottinghamshire, where William (1858–1921) was born. A model batsman and superb fieldersman, he made 24,899 runs in 25 seasons, 1880–1904, and had an innings of 228 in a test match against Australia in 1890. Also a footballer who represented Notts County and England, he died Jan. 29, 1921. Two of his nephews, John and George, played cricket for their county and country, George scoring 119 at Sydney on his first appearance against Australia in 1907, and heading the English batting averages in 1919. The latter's son, George Vernon (b. 1905), was a regular member of the Notts eleven 1932–39.

**Gunner.** One who operates a gun. A gunner in the Royal Artillery is a private soldier, though he does not necessarily serve a gun in action, but may be a driver, signaller, etc. The actual gun crew are called gun numbers. The rank of master gunner is peculiar to coast artillery units and is held by a warrant officer.

In the Royal Navy a gunner is a warrant officer engaged in duties connected with the gun armament and ammunition of ships and shore establishments. Naval and Royal Marine ratings actually serving are called gunnery ratings; there are also Royal Marine gunner, commissioned Royal Marine gunner, commissioned gunner, gunner (T), and gunner's mate.

Gunners in the R.A.F. are members of air crew and operate the defensive armament of aircraft, ranking as gunner I, II, III, or IV. In the R.A.F. Regiment all personnel below the rank of corporal are rated as gunners, irrespective of their duties.

The office of master gunner, St. James's Park, is an honorary rank awarded by the sovereign. Selected from among the colonels commandant, R.A., the holder deputises for the sovereign at R.A. ceremonies. The first appointment was in 1263; Viscount Alanbrooke held the post 1946–56.

**Gunnersbury.** District of Middlesex, England, part of the bor. of Brentford and Chiswick. It has Ealing and Acton to the N. and is served by suburban electric railways. An estate here, which includes a park, was purchased in 1761 for Princess Amelia, daughter of George II, whose parties at Gunnersbury House were famous. It was sold in 1786, pulled down in 1801, rebuilt on a smaller scale, and superseded in turn by a mansion belonging to the Rothschild family. Pop. 5,655. *See Brentford.*

**Gunnery School.** Specialist gunnery training establishments exist for all British fighting services. Instructors' and other higher courses for the artillery are held at the school of artillery, Larkhill, the school of A.A. artillery, Manorbier, and the coast defence gunnery school, Plymouth. (See Artillery Schools.) The principal naval gunnery school is H.M.S. Excellent (*q.v.*), on Whale Island. The practical application of naval gunnery is carried out at sea on exercises. The R.A.F. trains large numbers in both air gunnery and ground gunnery, the central gunnery school being at Leconfield. The qualified air gunner, whose course includes air firing on the range and at towed targets, is entitled to wear the brevet AG.

**Gunning, ELIZABETH** (1734-90). Duchess of Hamilton and of Argyll. She was the second of three



Elizabeth Gunning,  
Duchess of Hamilton  
and of Argyll  
From a print in the  
British Museum

daughters of an Irish squire, John Gunning of Castle Coote, co. Roscommon. With her elder sister Maria, she came to London in 1751, with the intention of going on the stage, but there the beauty of the pair made an extraordinary impression in society and among the populace. They were fêted everywhere, while crowds followed them in the streets. In 1752 Elizabeth married the 6th duke of Hamilton (d. 1758). After being engaged to the 3rd duke of Bridgewater, she married in 1759 the marquess of Lorne, who, in 1770, succeeded his father as 5th duke of Argyll. In 1776 she was created Baroness Hamilton, with remainder to her male issue as baron. She died May 20, 1790. Two of her sons became dukes of Hamilton, and two dukes of Argyll; she also had three daughters. There are several portraits of her in existence.

**Gunning, MARIA** (1733-60). Countess of Coventry. Elder sister of Elizabeth Gunning, she married the 6th earl of Coventry in 1752, less than three weeks after Elizabeth's marriage to the duke of Hamilton. She was generally regarded as being more beautiful than Elizabeth, and the loveliest woman at the court. In 1759 she was mobbed by an admiring crowd in Hyde Park, and was afterwards provided by the king



Maria Gunning, Countess of Coventry  
From a painting by F. Cotes

with a military escort. She died of consumption, Oct. 1, 1760, perhaps from the use of white lead for her complexion.

**Gunnisun.** River of Colorado, U.S.A. Rising in the S.W. part of the state, it flows W. and N.W. for 200 m., and joins the Grand, a main headstream of the Colorado. It has cut deep cañons, one, of granite, 40 ft. long and 2,500 ft. deep.

**Gun Pit.** Protected and camouflaged site for artillery. For guns engaging land targets, the pit is shallow, so that the gun may have maximum depression. Walls of sandbags protect the gun crews from blast, and the gun itself is concealed by a camouflage of netting or branches. A subsidiary pit is provided near each gun for the storage of ammunition. Gun pits to accommodate A.A. artillery are generally circular, so that the gun may traverse a complete circle. The development of mobile warfare has limited the use of gun pits for field and heavy artillery, and the entrenchment is now generally confined to A.A. guns not exceeding a calibre of 3.7 ins. Permanently sited guns are protected by emplacements. Anti-tank guns are sometimes put in pits when covering the line of a probable armoured advance.

**Gunpowder.** Oldest known explosive. It was first used for blasting about the 17th century and until the introduction of nitroglycerine into industry in 1867 was the only blasting explosive available. The constituents of modern gunpowder are saltpetre, charcoal, and sulphur. Early mixtures, the first of which was described c. 1250 by Roger Bacon, contained much more charcoal and sulphur than is used today.

Ordinary charcoal is unsuitable for gunpowder, and at present dogwood, alder, or willow is cut in

spring, stored 1½ to 3 years, then cut into pieces about an inch thick, packed into iron cylinders having holes at one end through which volatile constituents escape, and heated in a furnace for four hours. Air is excluded from the charcoal by allowing the cylinder to cool in a larger closed tank. Military gunpowder generally approximates to: saltpetre, 75 p.c.; charcoal, 15 p.c.; and sulphur, 10 p.c.; but for blasting the variations of composition are considerable. The ingredients are separately weighed out and roughly ground. It is usual to add some of the saltpetre to the sulphur to prevent the latter becoming electrified and igniting, the remainder being ground with the charcoal to prevent clogging.

After preliminary mixing by hand or in rotating drums, the ingredients are incorporated. The rollers are suspended so that they cannot approach within ½ in. of the bed, this minimising the risk of friction on a thin layer of powder. Ploughs constantly push the mass under the rollers, thoroughly grinding and mixing the ingredients, which are moistened with water; 80 lb. being milled at a time for 3 to 8 hours. One shaft drives six mills, which are separated by strong walls, water tanks being arranged so that an explosion in any mill floods them all. The caked powder is next broken up, the fragments arranged in layers between plates and pressed to high density.

The mass is broken down by passing between toothed bronze rollers, and automatic sieves grade the powder as to size, large fragments being recrushed and dust rejected. Gunpowder has been largely displaced as a sporting and military propellant by smokeless powder (*q.v.*), but finds considerable use for blasting, in certain types of shell and cheap sporting cartridges, and as an igniter for smokeless powder in cannon. See Explosives.

**Gunpowder Plot.** Conspiracy to blow up King James I and both houses of parliament on the day fixed for the opening of parliament, Nov. 5, 1605. Several Roman Catholic gentry, out of patience with the penal laws against the practising of their faith, were in the plot, and it was betrayed to the authorities because one of them wrote to warn his brother-in-law not to attend the opening. On Nov. 4 the buildings were searched and Guy Fawkes (*q.v.*) was discovered with gunpowder in a cellar under the house of lords. Fawkes was tortured and most of the conspirators, even

those who had escaped to the Midlands, were chased, slain, or captured. The ceremony of searching the vaults before the annual opening of parliament, and the small boys' "guy" which is burnt together with fireworks on Nov. 5, are legacies of the plot.

It has occasioned much controversial literature. A form of service for Nov. 5 was excised from the book of Common Prayer in 1859.

**Gun-room.** Room in warships so called because it was formerly situated at the end of the gun-deck. It was used in large ships by the gunner, in small ones by the lieutenants as a common living-room. The modern gun-room is a mess shared by sub-lieutenants, engineer sub-lieutenants, officers of the accountant branch junior to assistant paymasters of four years' seniority, and midshipmen. Senior officers mess in the ward-room (q.v.).

**Gun Running.** The smuggling of arms into places where their import is forbidden or strictly con-



**Gunpowder Plot.** Contemporary print of the conspirators : left to right, Bates, Robert Winter, Chris. Wright, John Wright, Percy, Guy Fawkes, Catesby, Thos. Winter

trolled, especially for political purposes. Governments which fear the armed resistance of subject peoples have to keep a look-out for gun-running, which may be a lucrative undertaking for the unscrupulous. The Persian Gulf and the Malay Archipelago have been regions associated with gun running; another was the W. Mediterranean during the Carlist intrigues in Spain. In 1914 came the Ulstermen's feat in Belfast Lough and that of the Irish Nationalists at Howth. There was an organized system between the mainland and Cuba during the rebellion in that island in 1898. Gun running in the Second Great War was one means by which the Allies helped partisans in occupied countries.

## GUNS AND GUNNERY IN THE NAVY

Francis McMurtrie, Editor, *Jane's Fighting Ships*

*The special types of gun used at sea, and the special problems of naval gunnery are here described. Land gunnery is described under Artillery, air gunnery under Air Fighting*

Naval guns are those engines on board fighting ships from which projectiles are discharged by explosive force. Edward III had iron and brass guns in his ships, and through subsequent centuries the mechanisms increased in number and variety. In Elizabeth's time ships carried the double cannon or cannon-royal, firing a 64-lb. projectile, and the demi-cannon, which was a 30-pounder. Smaller guns were the culverins, which were longer in proportion to bore, and fired shots ranging from 17 lb. to one pound. They comprised whole and demi-culverins, serpentine, sakers, minions, falcons, robinets, and bases.

### Petards and Murderers

Other guns, something like the modern howitzer, were called perriers. They were intended to discharge stone balls, carcass or case shot, fire-balls, and the like. There were also mortar pieces called petards and murderers, the latter being breech-loaders, like

usually sought to engage, i.e. 400 to 600 yards. Guns of this character continued to be made until 1830, at which date a more effective model of 32-pounder, weighing 56 cwt., replaced them: it was followed within ten years by a 68-pounder, weighing 95 cwt.

Shells were introduced into the French navy by Colonel Paixhans in 1824, and by the time of the Crimean war an 8-in. gun firing 56-lb. shells had replaced the 32-pounder as the lower deck armament of British line-of-battle ships. In 1856 W. G. (afterwards Lord) Armstrong produced guns on the "built-up" system, formed of wrought iron with steel for the inner tube. So superior was this to the former mode of construction that it soon superseded it. In the same period, rifled guns firing elongated projectiles were invented: these were used experimentally in the Crimean War. Here also it was Lord Armstrong who perfected the invention.

### Breech-loading Gun Introduced

In 1881 the first all-steel guns were manufactured. About the same time the breech-loading gun which had some time previously been adopted by foreign navies, was finally accepted in the Royal Navy, a more satisfactory type of breech mechanism having been evolved. Advantages of the new type of gun were manifold, not the least being that worn guns could easily be repaired by renewing the inner tube or lining when the rifling became eroded by the action of deleterious gases.

Guns increased enormously in size and weight, up to the 16-25-in. guns of the Benbow (1885), Sanspareil and Victoria (1887), which weighed 110½ tons. These guns were not mounted in any other ships, as it was found more advantageous to mount four guns of more moderate size rather than a pair of the larger weapons, since the former could not only be fired more rapidly, but could ultimately discharge a greater weight of metal. From 1896 to 1912 the standard calibre of big gun in the R.N. was the 12-in. It then became for a time the 13-5-in., which gave place in 1915 to the 15-in.

In the Russo-Japanese War of 1904-05 the effective range was about 6,000 yds.; it increased within ten years to nearly double this figure. At Jutland, in spite of low visibility, fire was opened at a range of nearly 19,000 yds., a range since appreciably exceeded.

Enormous strength is required to withstand the pressure of cordite

some other types of the time. Early guns were made of bronze and iron bars hooped together. The Sovereign of the Seas, launched in the reign of Charles I, mounted about 100 brass guns. Cast iron guns were made in England as early as 1545, and this construction continued for 300 years or more.

### In the Napoleonic Wars

All these guns were smooth-bores, firing round shot. In the French Revolutionary and Napoleonic Wars, the largest line-of-battle ships usually carried 32-pounders or 42-pounders as the lower deck armament; 24-pounders on the middle (or main) deck; and 18-pounders on the upper deck supplemented by shorter and lighter pieces known as carronades, from Carron in Scotland where they were first made. These fired shot of from six to 68 lb. in weight, and were designed to fire large calibre projectiles with accuracy to the distance at which ships in those days

and other propellant charges, and steel of perfect homogeneity, elasticity, and break-resisting strength is used. The breech block must combine the smallest possible weight consistent with complete resistance to the back pressure of the gases. The mechanism must ensure the most rapid opening of the breech, charging of the gun, closing the breech, and firing the gun. The mounting and carriage of the guns, which are usually placed in pairs, must provide for the easiest and smoothest working in elevation and in training on the roller-path, in order to find the target and attain immediate accuracy of aim. The whole of the weights of the gun and gunhouse are distributed over a large area, and are perfectly balanced for ease of rotation.

The 15-in. gun, with a length 42 times its calibre, weighs over 97 tons without the breech mechanism, and fires a projectile of 1,920 lb. with a cordite charge of 428 lb. The muzzle velocity is 2,450 ft. per sec., and the muzzle energy 84,070 foot-tons. Complete gear for working a pair of guns of this calibre is enclosed in a barbette mounting, surmounted by a gunhouse, the whole structure being commonly referred to as a turret. Ammunition hoists are centrally situated, trolleys from the magazines or running gear loading the projectiles and charges on the platform below, whence by hydraulic mechanism they are rapidly raised to a point behind the breech of the gun and rammed home.

#### Process of Manufacture

In the manufacture of big guns the operation begins with the casting of the steel ingot and the forging of it under pressure in some cases of 5,000 tons. The ingot is bored by means of a trepanning machine, and forged upon a mandrel into the form of a tube at a red heat under a powerful press which has a downward force of 3,500 tons or more, the tube being turned continuously during the operation. Having thus been forged approximately to the required dimensions, the gun tube is next turned by lathes, and bored by long machines, working usually from both ends at the same time, hardening or tempering being carried out in rape-seed oil.

In the British 15-in. and 16-in. guns, the tube is next wound with steel ribbon, about a quarter of an inch wide and a tenth of an inch thick. On a 12-in. gun there is usually a length of 120 m. of steel ribbon with 14 layers at the

muzzle and 75 at the breech. Then comes the shrinking on of the outer jacket, at a very high temperature. When it is cooled, this jacket becomes an integral part of the gun. After these operations the gun is internally rifled by special plant, and externally machined.

The 14-in. gun, of more recent design, is of the "built-up" type, strengthened by the shrinking on of successive outer tubes. This gives greater girder strength, a quality in which the wire-wound type of gun was found to be deficient, the general effect being to provide a lighter weapon with equal strength. Any tendency for the gun to droop at the muzzle is thus obviated.

#### Radar Fire Control

The naval gun of the Second Great War and after, with its breech and intricate fittings, its complex mounting, and its control and firing gear, represented one of the greatest achievements of human ingenuity. The application of radar to fire control had the effect of revolutionising both low angle and A.A. gunnery by giving increased accuracy of fire. The 15-in. gun, which was first installed in ships of the Queen Elizabeth class, was selected as the main armament for the battleship Vanguard, completed 1946.

During the First Great War an 18-in. gun was mounted in H.M.S. Furious and in certain monitors, but otherwise the largest gun in the British service was the 16-in. mounted in the battleships Nelson and Rodney (1925). Owing to treaty limitation of the size of battleships, these guns were arranged in triple mountings. In the King George V class, launched in 1939-40, there was a reduction in the calibre of the main armament to 14-in. with the weight-saving expedient of quadruple mountings, again dictated by treaty restrictions.

In the U.S. navy the standard heavy gun is the 16-in. This calibre was also mounted in ships of the Japanese navy which took part in the Second Great War; two Japanese battleships of exceptional size, the Musashi and the Yamato, were armed with 18-in. guns. German battleships in that conflict were armed with 15-in. and 11-in. guns, and those of Italy with 15-in. and 12.6-in.

Secondary guns in the Royal Navy comprise the 8-in., constituting the main armament of a few heavy cruisers built during 1923-30; the 6-in., which forms the

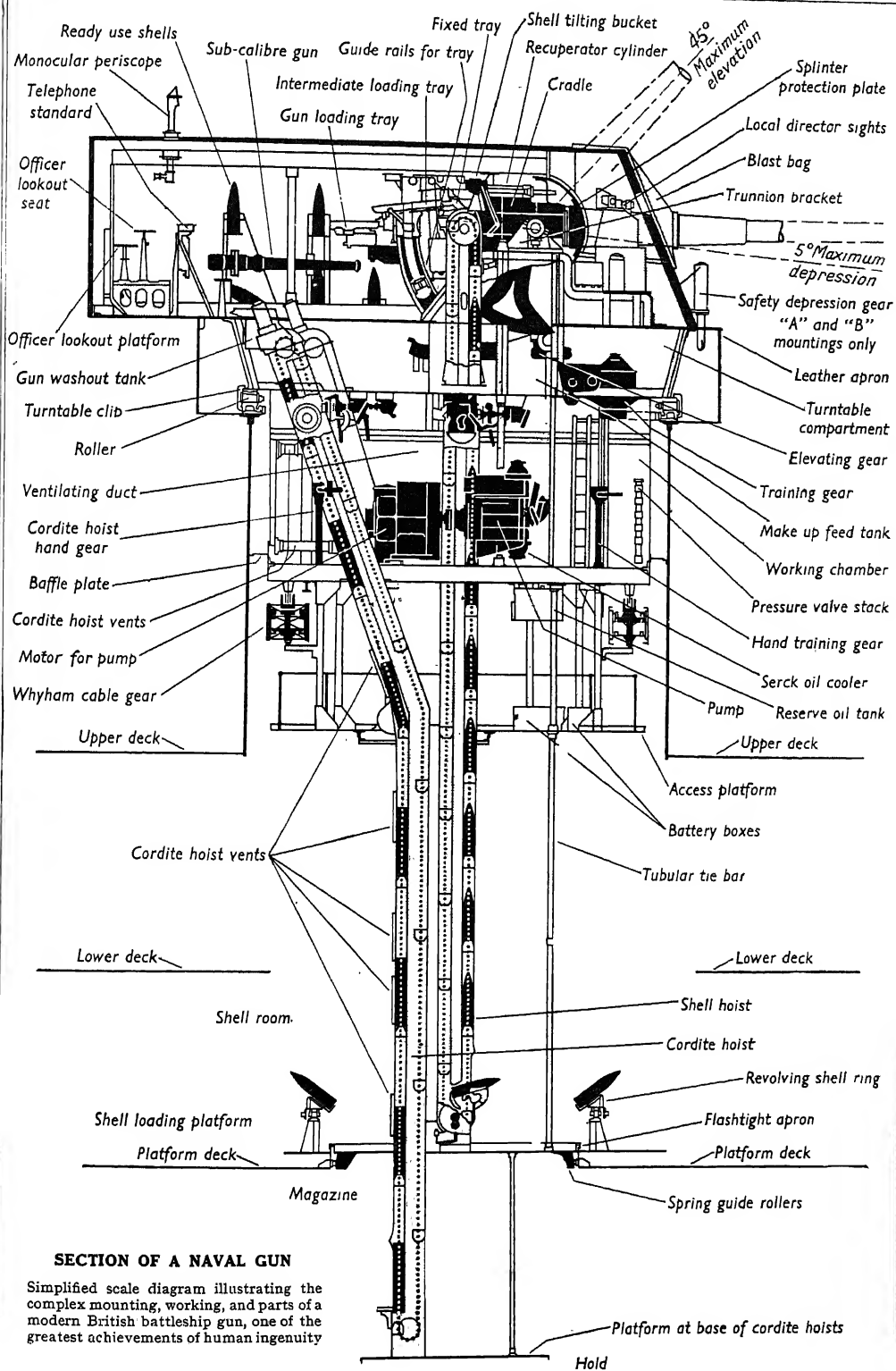
main armament of the majority of cruisers; the 5.25-in., main armament of the smallest class of cruisers and secondary armament of some battleships; the 4.7-in., main armament of the majority of destroyers; the 4.5-in., secondary armament of older battleships and main armament of some destroyers; the 4-in., main armament of certain destroyers and of sloops, frigates, minesweepers, etc.; the 3-in., mounted in corvettes and minesweepers; and numerous small A.A. pieces, of which the 40-mm. Bofors is the most popular. The 5.25-in. and 4.5-in. and some 4-in. are "combined purpose" guns, capable of firing at either high or low angles. All are semi-automatic in their operation. In the U.S. navy, following the Second Great War, the automatic principle was extended to even heavier guns, up to and including those of 8-in. calibre.

NAVAL GUNNERY is based upon knowledge of internal ballistics, by which is meant the behaviour of the gun and its projectile under the pressure of the gases generated, and of external ballistics, which are concerned with the flight of the projectile at various ranges and in varying conditions. An understanding of external ballistics, together with necessary allowances for movement of the firing ship and target, constitutes the first condition of accurate fire.

#### Large Ships Sunk by Gunfire

In the Second Great War, large ships sunk entirely or mainly by gunfire included H.M.S. Hood and Glorious, the German battleships Bismarck and Schamhorst, the Japanese battleships Kirishima and Yamashiro, and the French battleship Bretagne. In the case of the two German ships, torpedoes finished them off, but they were already in a sinking condition as the result of the battering they had received from the guns of their British opponents. Other conditions being equal, the biggest gun is likely to prevail. Combined with speed, it may enable a ship to select her own distance for attacking, opening fire outside the range of her adversary.

The tendency to increase the firing range has been accomplished mainly by adding to the propelling energy within the gun, and elevating the angle of fire. Scientific naval gunnery therefore requires the utmost continuous accuracy, as the opposing ships are moving at high speed, and the range is constantly changing at a rate that is not constant. Fleets or



### SECTION OF A NAVAL GUN

Simplified scale diagram illustrating the complex mounting, working, and parts of a modern British battleship gun, one of the greatest achievements of human ingenuity



squadrons do not normally move on parallel courses, since to do so would assist the aim of the opponent. Difficulties arise also from the mist and the condition of the atmosphere, wind, temperature, and other factors. At long ranges the trajectory—that is, the curve of flight of the projectile—is necessarily very high, its fall very steep, and the danger zone correspondingly narrow.

When ships are moving swiftly, the position of the target relatively to the firing gun changes during the flight of the projectile, which may occupy a period of several seconds, varying according to the range. Therefore the gun must be aimed, not at the ship in the position she occupies at the instant of firing, but at the position she will occupy when the projectile arrives. Some guide to this position is provided by the knowledge of the course she has previously pursued, whether direct or pursuing a curve under helm. To deal with the problem thus presented, observing and reckoning instruments of the finest and most ingenious character have been developed, such as the devices with which the names of Dreyer and Dumaresq are associated. First it is necessary to ascertain the range, bearing, and speed of the enemy, next to integrate these factors with the speed and changing curves of the firing ship, and then to transmit the result instantaneously to the guns.

#### Naval Gunnery Schools

Thus the system of training at the British naval gunnery school at Whale Island, Portsmouth, and instructional establishments at other ports, is of a highly scientific character. It is no longer sufficient, as in the early 20th century, merely to concentrate on teaching gunlayers individual accuracy in keeping their sights on the target. Instead of acting merely as a pointer, the director exercises remote control over the gun and its mounting.

The use of radar during 1939–45 ousted the earlier large range-finders with their maximum diameter at the base of 40 ft. Not only did radar make the gun increasingly accurate, it enabled it to get on to the target more quickly, so that it was no uncommon thing for the first shot to score a hit. It eliminated the use of searchlights in this connexion. By giving earlier warning of the proximity of an enemy, radar also makes possible a higher degree of preparedness of the armament.

H.M.S. Duke of York's successful engagement of the Scharnhorst in the dark of an Arctic night is an excellent example of the skilful use of radar in gunnery.

**Gunter, ARCHIBALD CLAVERING** (1847–1907). Anglo-American novelist. Born at Liverpool, Oct. 25, 1847, he went with his parents to California. Having been a civil engineer and a stockbroker, he went to New York in 1879. He wrote 29 novels. The first, *Mr. Barnes of New York*, 1887, was printed at his own expense, and circulated by a news company; over a million copies were sold before the author's death, and he successfully dramatised it and its successor, *Mr. Potter of Texas*, 1888. Gunter's success was due to his insistence on plot, movement, and incident, avoidance of the past tense, and creation of the illusion that the author himself did not know what was coming. In 1905 he edited Gunter's Magazine. He died Feb. 23, 1907.

**Gunter, EDMUND** (1581–1626). English mathematician. Educated at Westminster School and Christ Church, Oxford, he was ordained, and in 1615 was appointed vicar of S. George's, Southwark. His interests, however, were scientific, and in 1619 he was made professor of astronomy at Gresham College, London. He died Dec. 10, 1626. Gunter was the first to observe the variation of the compass. Several inventions still bear his name.

**Gunter's Chain.** Chain used in surveying. Its introduction was due to Edmund Gunter. It is 22 yds. long, divided into 100 links, and it allows of easy calculations of measurements, since an acre contains 10 sq. chains, or 100,000 sq. links. *See* Surveying.

**Gunther, JOHN** (b. 1901). An American journalist. Born at Chicago, Aug. 30, 1901, he was educated at its university, and was with the Chicago Daily News from 1922, being assistant London correspondent 1924–26. In Europe, the Balkans, and the Near East, he gained intimate knowledge of social and political life, and after his resignation from the paper in 1936 he travelled in the Far East and every S. American republic. He was attached to Gen. Eisenhower's H.Q. in 1943, and was radio commentator in New York on international affairs, 1942–45. Gunther made an outstanding reputation with *Inside Europe*, 1936. Later books: *Inside Asia*, 1939; *Inside Latin America*, 1941; *Inside U.S.A.*, 1947; *Roosevelt in Retrospect*, 1950.

**Guntur.** Town and district of Andhra, India. The town stands on the Grand Trunk road, 47 m. W. of Masulipatam. The French obtained it from Muzaffar Jang in 1753, and in 1778 it became British. The district was formed in 1904 from territory taken from Nellore and Kistna districts. Most of the district is a fertile plain; irrigation is by canals from the Kistna river, which forms boundaries N. and E. The Gundlakamma marks most of the W. boundary. There is trade in cotton and cereals, and the cultivation of Virginian tobacco, introduced in 1923, has made prosperous what was earlier a distressed population. The dist. has an area of 5,795 sq. m. Pop. (1951) dist., 2,549,996; town, 125,255.

**Gupta.** Name given to an empire that flourished in India c. A.D. 300–500. It was founded by Chandragupta and enlarged by his successor Samudragupta. The real Gupta empire was in N. India, where was its capital Pataliputra, but Samudragupta conquered almost the whole of the peninsula. After 450 it was attacked by the Huns, and when Skandagupta died about 480, it came to an end, although princes of the family ruled, under the overlordship of others, for some 350 years longer over a smaller area, known as Magadha. The Gupta era, long used in Indian chronology, dated from Feb. 26, 320. In the later 19th century the discovery of a number of Gupta inscriptions added to existing knowledge of this ancient Indian empire.

**Gurdāspur.** Former district, subdivision, and town in the Lahore division of the Punjab. It was divided in 1947 between the dominions of Pakistan and India, the subdivision and town of Gurdāspur going to India. Of the other sub-divisions of Gurdāspur district, one went to Pakistan, and three to India.

**Gurgaon.** Dist., area 2,234 sq. m., and town of the Ambala division of Punjab, India. The district lies between the state of Delhi and Rajasthan, and is bounded on the E. by the river Jumna. Close to the river the plain is irrigated by the Agra-Delhi Canal; here the Jats are good cultivators. Elsewhere the soil is sandy and the low hills are bare. Owing to the unreliable rainfall crops fail frequently. It is crossed by two main rlys. Rewari is the most important town. The Gurgaon experiment was a scheme of village welfare work carried out in the district.

Pop. (1951) 967,664. Gurgaon is a small town 20 m. S.W. of the city of Delhi, in a fertile plantation, and is the dist. h.q.

**Guriev.** Seaport of Kazakh S.S.R., capital of a region of the same name. Founded in 1640, the town stands on the Ural river, near its entry into the Caspian Sea, 200 m. E. of Astrakhan. It is linked by rly. with Kalagach and Orsk. A pipe-line connects it with the Emba petroleum fields 300 m. E.N.E., its oil refineries and cracking plant, established during the Second Great War, being its chief industrial works. Fishing is also important. Pop. (est.) 60,000.

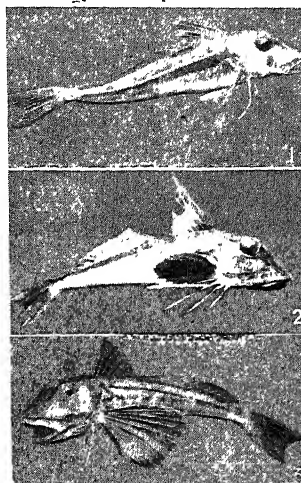
The chief asset of Guriev region is petroleum, centred on Emba, near which wells were sunk already in Tsarist times. Potash, salt, manganese, and coal are mined; borax is an important product. Fisheries, including a seal fishery, are centred on Fort Shevchenko. The climate of the region is too dry for arable agriculture; but goats, sheep, and camels are successfully reared. Area 98,600 sq. m. Pop. (est.) 240,000.

**Gurkha.** Name usually applied to those tribes in Nepal from which recruits for the Gurkha regiments of the army of British India were drawn. They came chiefly from five tribes, Mangar, Gurung, Thapa, Rana, and Kha, though Limbus and Rais also enlisted. There is a Mongol strain in their ancestry. Their principal religions are Buddhism and Hinduism, though their Buddhism is

scarcely distinguishable from their Hinduism.

A loose observance of caste rules and customary good humour permitted Gurkhas to mix freely with British troops, especially Highland regiments. Their characteristic weapon is a heavy, curved knife (kukri). Faithful, fearless, self-reliant, and possessing an inborn love of soldiering, they make first-class troops and rendered invaluable services to the British Commonwealth during both Great Wars, during which, besides the regular units of the Indian army, the Nepalese government placed contingents of their own army at the disposal of the Indian government. Between 1939 and 1945 the ten Gurkha regiments won 12 V.Cs. They saw fighting in N. Africa, Italy, Burma, and on the N.W. Frontier, and with the Chindits and parachute regts. in Burma.

With the granting of dominion status to India and Pakistan. Aug., 1947, an agreement was reached between the governments of the U.K., Nepal, and India by which eight Gurkha battalions were allotted for service under the British government, the other battalions (at that time 12 regular and seven temporary in number) for service with the army of the dominion of India, subject to satisfactory arrangements on terms and conditions of service. One difficulty arose from the fact that the Gurkhas while in British service had always been commanded by British officers. *Pron.* Goorka.



Gurnard. 1. Grey gurnard, *Trigla gurnardus*. 2. Red, *T. cuculus*. 3. Sapphirine, *T. hirundo*.

**Gurnard** (*Trigla*). Fish of a genus which includes about 40 species. Gurnards are distinguished by their large, ugly heads, which are covered with angular plates. The three front rays of each pectoral fin are modified into feelers somewhat resembling fingers, which are used not only in finding prey but in creeping on the sea bottom. Most gurnards make good table fish.

Seven species are found around the British coasts, the red gurnard (*T. cuculus*) being most frequently seen in the markets. It is bright red in colour, tinged in parts with silvery white, and the pink colour of its flesh is attributed to its feeding upon crustaceans. The grey gurnard (*T. gurnardus*) is also common, and is larger in size, being less esteemed for the table. The sapphirine gurnard (*T. hirundo*) is often 2 ft. in length, and is brown with beautiful blue pectoral fins. The piper (*T. lyra*) is a large red species with prominent snout and formidable spines. The gurnard generally makes a grunting noise when first captured, whence the name (*Fr. grogner*, to grunt).

**Gurney.** Name of an English family, known for its association with banking and Quakerism. Hugh le Gournay obtained land in Norfolk soon after the Norman Conquest, and there his descendants lived for centuries. In the 17th century some joined the Society of Friends. John and Henry Gurney, in 1770, set up a bank in Norwich; this became the firm of Gurney & Co., of which, towards the end of the century, another



Gurkha. Troops of a Gurkha regiment advancing through the Malayan jungle, one of the areas in which these magnificent fighters from Nepal distinguished themselves in the Second Great War

John became the head. He was the father of Elizabeth Fry and Samuel, Joseph and Daniel Gurney.

Joseph (*v.i.*) and Daniel entered the Norwich business, but Samuel (1786–1856), also a philanthropist interested in humanitarian movements, went to London and served in the business of his brother-in-law, Joseph Fry. In 1807 he became a partner in the firm of Richardson, Overend & Co., which under him became known as Overend, Gurney & Co. His sons carried on his business until 1865, when it was made into a joint stock company. On Black Friday, May 11, 1866, it failed with liabilities of over £11,000,000. The Norwich bank continued to flourish until absorbed by Barclays 1896. Earham Hall, near Norwich, was long the family residence.

**Gurney.** Name of a family of shorthand writers. Thomas Gurney (1705–1770) was born at Woburn, March 7, 1705, his father being a miller. He himself became a clockmaker and then a schoolmaster. About 1740 he was made official shorthand writer at the Old Bailey, the first appointment of its kind. He was shorthand writer in other courts of justice and in the house of commons. He died June 22, 1770. His system was published as *Brachygraphy*.

His son Joseph (1744–1815) succeeded to the positions. He published reports of state trials and further editions of *Brachygraphy*. The business of shorthand writer was carried on by Joseph's son, William (1777–1855), and then by the latter's son, Joseph (1804–79). William, in 1813, was recognized as official shorthand writer to the two houses of parliament, and Joseph held the post from his father's resignation in 1849 until his own in 1872, when the office passed to a nephew, W. H. Gurney Salter. Joseph died Aug. 12, 1879. Salter issued a text book of the Gurney system of shorthand, 1884.

**Gurney, SR GOLDSWORTHY** (1793–1875). An English inventor. Born at Padstow, Feb. 14, 1793, he became a surgeon, but gave up practice in 1820 to devote himself to scientific experiments. In 1823 he published a series of lectures on chemistry, to which Faraday acknowledged his indebtedness. Gurney's first invention was the oxy-hydrogen blowpipe; soon afterwards he patented the Drummond light (limelight obtained by the fusion of magnesia and lime). His high-pressure steam jet was adapted to Stephenson's locomotive, increasing its speed to

30 m.p.h. When the jet was applied to blast furnaces it greatly expedited the making of iron. Gurney introduced steam stage-coaches between Bath and London, which proved efficient and profitable until their suppression as a result of heavy tolls. The system of lighting and ventilation in the houses of parliament was designed by Gurney. He died Feb. 28, 1875.

**Gurney, JOSEPH JOHN** (1788–1847). A British philanthropist. Born Aug. 2, 1788, a son of John Gurney of Earham Hall, Norfolk, he studied at Oxford, though not in the university. He became a partner in the bank of Gurney & Co., but his



Joseph John Gurney, British philanthropist

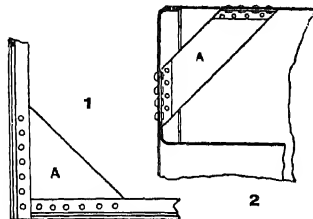
real work was done as a minister of the Society of Friends, and as an advocate, with his sister, Elizabeth Fry, of the abolition of slavery and of prison reform. To promote these causes he travelled in America and elsewhere. He died Jan. 4, 1847.

**Gusev, FEODOR TARASOVITCH** (b. 1905). Russian diplomatist. He was born in what is now Leningrad region, April 29, 1905, and educated at Leningrad university, graduating in law in 1931. He worked in the people's commissariat for foreign affairs, 1937–1942, being chief of the second European dept., 1939–42. Gusev was Soviet minister to Canada, 1942–43, and then ambassador to Great Britain, 1943–46. He was one of the members of the Soviet delegation to the Paris peace conference in 1946, and became deputy minister of foreign affairs.

**Gusher** (Icelandic *geyser*, to gush). Literally, anything that rushes out violently, like water from a geyser. The term is applied to an oil well flowing out of control and spouting a column of oil high into the air. Drilling methods and well-head fittings have made this a rare event.

**Gusset.** Triangular piece of material let into a garment or other object. The word comes from Old French *gousset*, a flexible piece of armour which filled a gap between two other pieces in a coat of mail. A gusset plate is a usually triangular piece of steel plate used to connect the joints in a steel or iron structure, and is often used in pairs, one at each face of the

members to be bolted or riveted together, *e.g.* for riveting together a bridge girder boom and its web



Gusset. Examples of gussets, (A): 1, a lattice girder; 2, Lancashire steam boiler

bracing members. It is also a plate connecting two parts of a structure with the object of providing additional rigidity, *e.g.* connecting the trough flooring of a bridge to the main girders. See Bridge.

**Gustav Line.** German defence system of the Second Great War, in central Italy. It ran just N. of the river Garigliano and its tributary, the Rapido, from the Gulf of Gaeta to Monte Cassino, and guarded the one practicable route from Naples to Rome along which the Allies must pass. A strong line naturally, it had been heavily fortified, and was powerfully defended by picked troops. Units of the U.S. 5th army reached the town of Cassino on Feb. 2, 1944; but not until a combined attack was made by the British 8th and the U.S. 5th armies, May 12–18, was Monte Cassino taken and the line breached and overrun. See Cassino.

**Gustavus I**, called VASA (1496–1560). King of Sweden 1523–60 and founder of the Vasa dynasty. His real name was Gustav Eriksson, his familiar surname, which he himself never employed, being derived from the fascine resembling a vase in his family arms. Born at Lindholmen, Upland, May 12, 1496, son of a Swedish noble, he was educated at Uppsala, and joined the army. In 1518 he carried the Swedish standard at the battle of Brännskyrka, when his cousin, Sten Sture, defeated the Danes. He was carried off by the Danes and imprisoned, but escaped.

After the Blood Bath of Stockholm, 1520, in which his father was one of the victims, Gustavus succeeded in rousing the people to revolt, and drove out the Danes. In 1523 he was proclaimed king by the Swedish diet, captured Stockholm, and was crowned, thus bringing to an end the somewhat turbulent union of Scandinavia. In 1524 he effected a treaty of peace with Denmark. An encourager of Lutheranism, in 1527 he definitely

broke with Rome and established the reformed religion in his dominions. He encouraged trade and commerce and the establishing of schools and laid the foundations of a navy. In 1544 the crown was made hereditary in his family. He died Sept. 29, 1560, and was buried in Uppsala cathedral.

**Gustavus II** OR GUSTAVUS ADOLPHUS (1594-1632). King of Sweden. Born at Stockholm, Dec. 9, 1594.

he was the son of Charles IX and the grandson of Gustavus Vasa. He is said to have been familiar with five languages when only a boy, while he was also trained in the art of government. His father made him his assistant, and as duke of Vestmanland he had some authority of his own.

Gustavus succeeded his father in 1611 on the throne, which he had to hold against the claims of Sigismund of Poland, who was of a rival older branch of the family. He soon reorganized the government and waged successful wars with Denmark and Russia for the recovery of Swedish provinces on the Baltic. Then turning against Poland, he seized Riga in 1621, won a resounding victory at Walhof in 1626, and made a statesmanlike peace in 1629. His disciplined troops had become the best instrument of war in Europe, and he himself the greatest living master of the art of war.

Meanwhile in the Thirty Years' War the Catholic and Imperial party had established their ascendancy. Gustavus intervened partly as the champion of the Protestant cause, but also as an empire-builder who saw the security of his dominions threatened. He landed in Pomerania in 1630, and having frightened or persuaded Brandenburg and Saxony into cooperation, opened those brilliant campaigns which swept back the Catholic tide and established his position among the greatest captains of history. His victory over Tilly at Breitenfeld, Sept. 7 (O.S.), 1631, and his triumphal march through W. and S. Germany amazed all Europe. But Wallenstein placed himself between the Swedish king and his base in Saxony, and after a period of strategic marches and with-

drawals battle was joined. Gustavus fell by an unknown hand in the hour of victory at Lützen, Nov. 6 (O.S.), 1632.

Gustavus married Marie Eleonora, a member of the Hohenzollern family, and had one daughter, his successor, Christina. The greatest soldier and king his country has produced, his character shows attractive traits usually lacking in the protagonists of the times. He was not without compassion, was loyal to his allies, and did not overdrive his own people, though he taxed them excessively. Among a mass of literature may be mentioned *Lives*, by J. L. Stevens, 1885; C. R. L. Fletcher, new ed. 1923. *See* Thirty Years' War.

**Gustavus III** (1746-92). King of Sweden 1771-92. Born at Stockholm, Jan. 24, 1746, he was the first ruler of the native-born Holstein-Gottorp line. He was in Paris when the death of his father, Adolphus Frederick, recalled him to Sweden. In 1772 he effected a *coup d'état* against the nobles.

Gustavus was so devoted to all things French that he sought to copy the luxury of Versailles, and increased taxation to such an extent as to alienate his people. But he strengthened the administration and the navy, set up a measure of free trade, and encouraged a national costume and drama. In 1788 he was responsible for an ineffective and unpopular war with Russia. A conspiracy of nobles was formed, and Gustavus was shot in Stockholm, and died thirteen days later, March 29, 1792.

**Gustavus IV** (1778-1837). King of Sweden 1792-1809. He was born at Stockholm, Nov. 1, 1778, the son of Gustavus III. For the first five years of his reign the kingdom was under the regency of his uncle. Obstinate and unbalanced, Gustavus allied himself with England, lost Finland to the Russians, and Stralsund and Rügen to the French. In 1809 his army and nobles combined to dethrone him. He died Feb. 7, 1837, at St. Gall, Switzerland.

**Gustavus V** (1858-1950). King of Sweden. Born at Drottningholm, June 16, 1858, he studied at Uppsala university and in 1875

entered the army. His marriage in 1881 with Victoria (1862-1930), daughter of the grand duke of

Baden, united the 19th cent. Bernadotte (q.v.) dynasty with the ancient line of Vasa. He succeeded his father, Oscar II, Dec. 8,

1907. During the First Great War his



Gustavus V,  
King of Sweden

sympathies were pro-German, but he was unable to persuade his ministers to adopt a militant policy. In the Second Great War he was strictly neutral. As Mr. G., he was well known on the tennis courts of the Riviera. He died Oct. 29, 1950; his elder son (b. 1882) succeeded as Gustavus VI.

**Güstrow**. Town of East Germany in Mecklenburg. It stands on the Nebel, 23 m. by rly. S. of Rostock. It has a 13th century cathedral (restored 1868); a 16th century town hall; a Renaissance castle; and a fine late Gothic parish church with paintings and carvings. It is an industrial centre. Güstrow was founded 1226; a princely residence from 1316; the headquarters of Wallenstein in 1628-29. Pop. 19,620.

**Gut**. Animal intestines which when removed and prepared are used for various commercial purposes. The entrails from freshly-killed sheep or other animals are removed, thoroughly washed, trimmed, and scraped free of the softer surface layers, and are then sold for sausage coverings, being preserved in salt until required. The process of gut-spinning is used where the gut is to be made into strings for musical instruments or cords for rackets, etc., various lengths of scraped gut being sewn together, and twisted on a spinning wheel. The spun gut is then dried in the open air. Silkworm gut as used for fishing tackle is made from silkworms. Surgical catgut is made from the submucous cellular coat of the intestines of sheep.

**Gutenberg** OR GENSFLEISCH, JOHANN (c. 1400—c. 1468). German inventor of printing from movable types. Born at Mainz, he lived during 1420-26 at Strasbourg, where he perfected his invention. He returned c. 1444 to Mainz, where he was assisted financially by a partnership with J. Fust, a goldsmith, who foreclosed on a mortgage: and technically by



*Gustavus Adolphus*  
After Van Dyck



Gustavus IV,  
King of Sweden

Fust's son-in-law, Peter Schoffer, an engraver, who is credited with the invention of punches and matrices. Gutenberg died at Mainz, probably in 1468.

An astronomical calendar, a fragment of which was discovered in 1901, a Latin Bible, and a Latin dictionary, approximately dated 1447, 1458, and 1460 respectively, and two or three other works, are attributed to Gutenberg alone, but no book bears his name. A Gutenberg museum was founded in 1901 at Mainz, where a statue was

The true Effigies of John Gutenberg Delincated from the Original Painting at Mentz in Germany.



Johann Gutenberg, the German inventor of movable type printing  
From an old engraving

erected in 1837, and where festivals were held in 1837, 1840, and 1900. See Coster, L. J.; Typography.

**Gütersloh.** Town of Germany. It is in Westphalia, 11 m. S.W. of Bielefeld. It has textile, iron, wood, brewing, and other industries, and an extensive trade in Westphalian ham and sausage. The regional rye-bread, *pumpernickel*, is famous for its nutritive value. Pop. 25,879.

**Guthrie.** City of Oklahoma, U.S.A., the co. seat of Logan co. It stands on the Cottonwood and Cimarron rivers, 30 m. N. of Oklahoma City, and is served by rlys. Notable buildings include the federal building, the city hall, a county courthouse, a Carnegie library, and the marble masonic cathedral. There are cotton and flour mills, foundries, machine and rly. shops, and steel and concrete manufactures. Mineral springs attract many visitors. Founded in 1889, the year Oklahoma was thrown open to white settlement, Guthrie was the capital of the territory from

1890 until 1907, but it was superseded by Oklahoma City as state capital in 1911. Pop. 10,018.

**Guthrie, Sir James** (1859-1930). Scottish painter. Born at Greenock, June 10, 1859, he was educated at the university of Glasgow and studied art in London and Paris. He became prominently identified with the Glasgow school (*q.v.*), though his work is cosmopolitan and, in its later aspect, akin in style to that of Sargent.

Elected A.R.S.A. in 1888, and R.S.A. four years afterwards, he was chosen president of the Scottish Academy in 1902. He was knighted 1903. Died Sept. 6, 1930.

**Guthrie, Thomas** (1803-73). Scottish divine. Born at Brechin, July 12, 1803, he was educated at Edinburgh and Paris. After managing his father's bank, 1827-29, he became minister of Arbirlot, 1830; Old Greyfriars. 1837; S. John's, Edinburgh, 1840-43; and, after the disruption, of Free S. John's, 1843-64. A powerful preacher, he took a leading part in the promotion of a national system of education, of ragged schools, temperance, and social work among the poor. In 1845-46 he raised £116,000 for the Free Church.

He was moderator of the Free Church general assembly, 1862; and first editor of *The Sunday Magazine*, 1864-73. He died at St. Leonards, Feb. 24, 1873. A voluminous writer, whose works had a wide circulation in the U.S.A., he wrote *Pleas for Ragged Schools*, 1847-62; *A Plea for Drunkards*, 1850; *The City, its Sins and Sorrows*, 1857. His son, Charles John, Lord Guthrie (1849-1920), was a judge of the court of session.

**Guthrie, Thomas Anstey.** English novelist and playwright who wrote as F. Anstey (*q.v.*).

**Guthrum** (d. 890). Danish king of E. Anglia. He gained a victory over Ethelred and his brother Alfred at Reading in 871, and after Ethelred's death marched

with two other kings to Cambridge in 875, occupied Wareham in 876, and in 877 was bought off by a treaty. In 878 he was defeated by Alfred at Ethandune (Edington), Wilts, and surrendered in his camp at Chippenham. By the peace of Wedmore he agreed to become a Christian, to give hostages, and to leave Wessex to Alfred. He was baptized under the name of Athelstan, Alfred standing godfather. In 885 he failed to renew his hostages and permitted an attack on Wessex, but was defeated and concluded the treaty known as Alfred and Guthrum's peace. See Wedmore, Treaty of.

**Gutierrez, Juan Maria** (1809-78). Argentine poet and writer. Born at Buenos Aires, he was for some time an exile in Chile, but after the downfall of the dictator Rosas he returned and became rector of the university in his native place, where he died Feb. 26, 1878. An ardent patriot, his hatred of Spanish rule is exemplified in his ode *To the May Revolution*, 1841, and in *This Year and That*. He is at his best in his shorter poems, which are distinguished by correct and elegant style. He was the author of a South American anthology, *America Poetica*.

**Gutta-percha** (Malay *getah*, gum; *percha*, name of tree). Substance resembling rubber prepared from the juice (latex) of various plants. It is collected from the tree *Palaquium gutta*, and a number of other *Palaquium* species yield similar but inferior products. The tree is a large one growing up to 60 ft. high and 4-5 ft. in diameter. The latex occurs in isolated sacs in the bark and in the leaves. The yield obtained by tapping the bark is



Gutta-percha. Leaves and flowers of *Palaquium gutta*

small, and native gatherers therefore fell the tree and cut rings round the bark. To avoid wholesale destruction of the trees, in Java the leaves are collected at time of maximum latex content, cut up, ground with water, and allowed to ferment. The gutta separates and floats to the surface. It is washed and moulded into blocks containing 80 to 90 p.c. pure gutta. Extraction with petrol removes resins and yields a product containing only 1 p.c. resin. This purified product is used for the outer covering of golf balls. Gutta-percha is a good electrical insulator and is suitable for use in submarine cables.

The essential ingredient of gutta-percha, balata, and rubber is a hydrocarbon, caoutchouc, the properties differing through differences in the arrangement of the atoms in the molecule in the respective products. At ordinary temperatures gutta and balata are harder and less elastic than rubber, but they soften on heating and can be moulded in boiling water. On the other hand, though, like rubber, they can be vulcanised, the product is not so good. *See* Balata; Rubber.

**Gutter** (Lat. *gutta*, a drop). A trough or channel for carrying away water or other liquid. The term is used for similarly shaped formations with other uses, e.g. the narrow rectangular blank space separating adjacent pages of type in a printer's forme. Gutters at the sides of roads are termed channelling, and are stone or concrete, with gullies at intervals to collect the run-off from the road surface and convey it to the sewer.

Roof gutters deal with rain-water which falls on a building; eaves gutters, made of zinc or steel or asbestos-cement, catch the water from the roof and take it to down pipes which terminate over a gully or drain, whence the water runs by gravity to a surface-water sewer. Box gutters or valley gutters, formed behind a parapet wall or at the meeting of two intersecting pitched roofs, are constructed of lead sheet laid over a suitably shaped wooden base. A fall must be provided in gutters of all types, so that the water flows down towards the discharge point by gravity. In eaves gutters this is arranged by fixing the guttering at an angle from the horizontal; in box and valley gutters the floor of the gutter itself is constructed with a suitable fall. *See* Drainage; Road; Roof; Sewer.

**Guttiferae**. Family of trees and shrubs, natives of humid regions in S. America, India, and Africa. They have undivided, leathery, opposite leaves, and white, yellow, or pink flowers, often imperfect. They exude a yellow gum-resin, that obtained from *Garcinia morella* and other species forming the gamboge of commerce. Mangosteen is the fruit of *Garcinia mangostana*; and the mamee-apple that of *Mammea americana*.

**Gutzkow, KARL FERDINAND** (1811-78). German dramatist and novelist. Born in Berlin, March 17, 1811, after studying at several universities, in 1835 he published *Wally, die Zweiflerin* (Wally, the Sceptic), an attack on marriage and divine revelation, for which he was sentenced to three months' imprisonment. He became one of the "Young Germany" writers, publication of whose future work was forbidden by a special edict of the federal diet. In 1847, however, he was appointed dramatic adviser to the Dresden court theatre. He had already won distinction on the stage with his *Richard Savage*, 1839; *Zopf und Schwert* (The Queue and the Sword), 1844; and other plays. He died at Frankfurt-on-Main, Dec. 16, 1878.

**Guy**. Rope or chain used to support or steady a part of a structure, or to hold it against movement. Tents are kept firm after erection by guys which support the tent poles and are secured at the lower ends to stakes or pegs driven into the ground. Masts or flagstaffs are similarly fastened down. Guys may hold temporarily a part of a structure which is being erected or lifted into place. The jib of a crane is steadied and supported by a guy often consisting of a chain or a wire rope. The function of a stay (*q.v.*) is similar, but this term is used for a permanent rope, or for a wood or metal member having the same function.

**Guy, THOMAS** (c. 1645-1724). English bookseller, printer, and founder of Guy's Hospital (*q.v.*), London. Born in Southwark, and educated at Tamworth, he was apprenticed to a London bookseller, 1660-68. Becoming a freeman of the Stationers' Company, he set up in business at the corner of Lombard Street and Cornhill, and made a feature of cheap Bibles, imported from Holland; he became a printer to Oxford university, 1679-92. He was M.P. for Tamworth, 1695-1707. He lived sparsely, acquiring a large fortune, partly in South Sea stock,

and is best remembered by his benefactions.

He founded almshouses and built the town hall at Tamworth:



Thomas Guy, founder of Guy's Hospital

became a governor of St. Thomas's Hospital, for which he built and furnished three wards; spent £18,793 in founding in Southwark the hospital known by his name, and left £200,000 for its endowment. He also gave £400 a year to Christ's Hospital. Many of his benefactions were made known only after his death, Dec. 27, 1724.

**Guy de Lusignan** (d. 1195). French crusader and king of Jerusalem and Cyprus. Younger son of Hugh the Brown of Lusignan, of a great French feudal family, he married in 1180 Sybilla, daughter of the king of Jerusalem and received the title of count of Jaffa and Ascalon. On the death of Baldwin V, Guy became king of Jerusalem, 1186. He was captured at Tiberias by Saladin, 1187, but set free on condition that he ceased to fight against Islam, which promise he soon afterwards broke.

His title to the throne was challenged by Henry of Champagne who was called to the throne by election in 1192, whereupon Guy purchased Cyprus from the Knights Templars, and established a new principality on the island. His brother, Amalric, succeeded him in 1195, became king of Jerusalem, 1197, and founded the Lusignan kings of Cyprus.

**Guy Mannering; OR, THE ASTROLOGER**. Second novel by Scott. Written in six weeks, founded on old Galloway and Ayrshire traditions, and published in Feb., 1815, it formed a notable departure from its predecessor, *Waverley*. Its descriptions of coast scenery are a prominent feature: the chief characters include the partly autobiographical Colonel Mannering; Dominie Sampson, whose exclamation "Prodigious!" has become proverbial; Pandie Dimmont, the Liddesdale farmer; Meg Merrilies; Gilbert Glossin, the wily attorney; and his smuggler accomplice Dirk Hatteraick. The work was dramatised by D. Terry with Scott's aid.

**Guy of Warwick**. Mythical hero of an Anglo-Norman metrical romance. Sir Guv, son of a steward of the earl of Warwick, to gain the hand of the earl's daughter Felice or Phillis goes



through knightly adventures at home and abroad, is then married, but, in remorse for the blood he has shed, becomes a pilgrim to the Holy Land. He returns, and, after killing the Danish giant, Colbran, in a duel to decide the issue between Athelstan and the Danes, retires unknown to a hermitage at Guy's Cliffe (*q.v.*), near Warwick, but reveals himself to his wife Felice by sending her a ring when he is on the point of death. The poem, of great length, and supposed to have been written about the 13th century, in couplets and romance stanzas, was once enormously popular. A MS. copy is at Caius College, Cambridge; there are fragments in the Auchinleck MSS. at Edinburgh, and the text was edited by J. Zupitza, 1883-87.

**Guyon, JEANNE MARIE** (1648-1717). French mystical writer. Jeanne Marie Bouvier de la Motte was born at Montargis, April 13, 1648, and in 1664 married Jacques Guyon, by whom she had five sons. After her husband's death in 1676 she came under the influence of Lacombe, a quietist teacher, and began to advocate quietism, at first in Savoy, from 1686 in Paris. Although she had the support of Fénelon, she was imprisoned in 1688 and 1695-1702 for teaching the heresies of Molinos. She taught that the essence of religion consisted in the contemplation of God, and that good deeds were of less moment. She died at Blois, June 9, 1717. D. Macfayden edited an Eng. ed. of her works 1902-04. *Consult* The Archbishop and the Lady, Michael de la Bedoyère, 1956.

**Guyon, RICHARD DEBAUFRE** (1803-56). British soldier. Born at Walcot, near Bath, March 31, 1803, he entered the Austrian army and reached the rank of captain. He retired in 1839, and settled in Pest, but when the Hungarian rising broke out in 1848 he



Richard Guyon,  
British soldier

commanded the Landsturm. After the victory of Schwechat in Oct., he was put in command of a division. He succeeded in raising the siege of Komorn in April, 1849, but when the Hungarians collapsed Guyon escaped with Kossuth to Turkey. Joining the Turkish army in 1852, he fought against the Russians in Anatolia during the Crimean War, but died suddenly at Scutari, Oct. 12, 1856.

**Guy's Cliffe.** English estate, on the bank of the Avon, 1½ m. N. of Warwick. In the grounds are the cave said to have been hewn for himself by Guy of Warwick (*q.v.*) and the chapel of S. Mary Magdalen, founded to his memory by Richard, earl of Warwick (d. 1439), and containing a mutilated statue of the hero. There were hermit residents at Guy's Cliffe during the reigns of Edward III and Henry IV, and another occupant of the hermitage was John Rous the antiquary (d. 1491), who was its chantry priest. In the house, mainly 18th-century, Mrs. Siddons lived in 1773 as a companion; it fell into disrepair, and it was decided in 1952 to demolish it.

**Guy's Hospital.** Teaching Hospital on a site of 12 acres near London Bridge, founded by



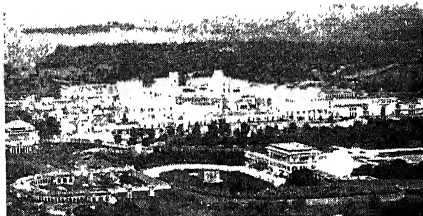
Guy's Hospital  
arms

Thomas Guy (*q.v.*) in 1721. It has 727 beds, including private accommodation for 70 patients in Nuffield House, 1935, and 45 beds for psychiatric patients in York Clinic, 1941. The Surgical block is the original Guy's House, 1729, seriously damaged by bombs in 1941; other buildings include the medical block (Hunt's House, 1852, extended 1871); physiotherapy department (Shepherd's House, 1921); Henriette Raphael nurses' home, 1901, extended by the Nuffield home, 1940; medical school with Wills' library, 1903; Gordon museum, 1905. The dental school, 1888, is the largest in the U.K. Distinguished teachers at the hospital have been Astley Cooper, Richard Bright, Thomas Addison, and William Gull. Hodgkin was a lecturer, and Keats a student.

**Guzman Blanco, ANTONIO** (1828-99). Venezuelan dictator. Born at Caracas, Feb. 29, 1828, he became a lawyer and then a soldier, fighting in the civil disturbances of the time. During 1863-68 he was vice-president of Venezuela, and in 1870, as the result of a revolution, became dictator of the country. He was deposed in 1889, whilst he was in Europe serving as envoy to the Powers, one reason for his fall being his corrupt methods of making money. He helped to improve education in,

and to increase the trade of, his country. He died in Paris, July 29, 1899.

**Gwalior.** Former princely state, the largest in central India, incorporated 1948 in Madhya Bharat, itself merged in Madhya Union 1956. Recognized as independent by the British government



Gwalior City. The palace, began in the early 16th century, a magnificent example of Hindu architecture

in 1782, it had an area of 26,008 sq. m. About 25 per cent of the land is devoted to growing millet, gram, and wheat. There are extensive forests, and deposits of mica, iron, limestone, and sandstone. The chief industry of the area is the manufacture of cotton goods.

The people are a martial type, and the army was always among the best of the Indian princely state forces. It played a prominent part in the Burma Campaign (*q.v.*) of 1941-45, and Gwalior was the area in which Wingate's Chindits (*q.v.*) underwent their jungle training. In 1945 the foundation stone of a medical college was laid at Gwalior in celebration of the birth of a son to the ruler, who was a maharaja.

**Gwalior.** City of Madhya Union, India, within the former princely state of Gwalior. It occupies the site of the old city of Gwalior, but Lashkar, 2 m. S., was the capital of Gwalior state. It contains Jain and early Hindu antiquities and the palace of Man Singh. The fort of Gwalior stands on an isolated hill above the town. Pop. (1950) 241,577.

**Gwelo.** Town of Southern Rhodesia. It is 198 m. S.W. of Salisbury and 113 m. N.E. of Bulawayo, with which towns it is connected by rly. It is in a goldmining district. European pop. (1952) 7,310.

**Gwent.** The Welsh name for Monmouthshire (*q.v.*).

**Gwinner, ARTHUR VON** (1856-1931). German banker. Born at Frankfurt-on-Main, April 6, 1856, he was the son of the biographer of Schopenhauer. He was for a time consul at Madrid. In 1888 he founded in Berlin a banking

company bearing his own name; in 1894 he joined the board of the Deutsche Bank, and from 1901 to 1929 was its virtual head. His interests included the Bagdad rly., Bavarian nitrogen, and the international petroleum trade. A member of the upper house 1909-18, he died Dec. 29, 1931.

**Gwyniad.** Small fish belonging to the genus *Coregonus*. Found in Lake Bala, Wales, it belongs to the salmonoid group, and much resembles a small herring. It is probably only a local race of the powan, common in the Lake District and in Loch Lomond.

**Gwynn, GWYN, OR GWIN, NELL OR ELEANOR** (1650-87). English actress, mistress of Charles II.

Born Feb. 2, 1650, either in an alley in Drury Lane or at Hereford, she attracted notice as an orange-seller at the Theatre Royal, Drury Lane, where in



Nell Gwynn, actress and favourite of Charles II  
After Sir Peter Lely

1665 she made her first stage appearance as Cydaria in Dryden's *Indian Emperor*. Until 1682, when she left the stage, she was specially successful in broad comedy and in daring prologues and epilogues, though Pepys thought her a failure as a serious actress.

Nell became the king's mistress about 1669, and retained his affection until his death, 1685, his dying words being "Let not poor Nelly starve." She died in London of apoplexy, and was buried in St. Martin-in-the-Fields. Of her two sons by Charles, the elder was created duke of St. Albans in 1684. Her sprightliness and good nature made her a universal favourite. See Charles II; consult also Lives: C. Chesterton, 1912; L. Melville, 1923; A. I. Dasent, 1924; Pretty Witty Nell, C. Bax, 1932.

**Gwynn, STEPHEN LUCIUS** (1864-1950). Irish author. Born Feb. 13, 1864, he was educated at S. Columba's College, Rathfarnham, and Brasenose College, Oxford. After teaching classics for nine years, in 1896 he became a journalist in London, but returned in 1904 to Ireland, representing Galway at Westminster as a Nationalist, 1906-18. From 1932 he was president of the Irish literary society. He died June 11, 1950. His many works comprise poems, biographies, essays, and Irish studies, e.g.

*The Decay of Sensibility*, 1900; *Irish Books and Irish People*, 1919; *Collected Poems*, 1923; *Experiences of a Literary Man*, 1926; *Life and Friendships of Dean Swift*, 1933; *Life of Goldsmith*, 1935; *Fond Opinions*, 1938.

**Gwynne, HOWELL ARTHUR** (1866-1950). A British journalist. Born at Swansea, he went to the local grammar school. Reuter's correspondent, 1893-1904, he travelled in Rumania, Ashanti, China, and followed the S. African War. Editor of *The (morning) Standard*, 1904-11, he was then editor of the *Morning Post* until that paper was merged with the *Daily Telegraph*, 1937. He was made C.H. in 1938, and died June 26, 1950. His books included a political novel, *The Will and the Bill*, 1923.

**Gwynne-Vaughan, DAME HELEN CHARLOTTE ISABELLA** (born 1879). British botanist and administrator. Born Jan. 21, 1879, Helen Fraser was educated at Cheltenham Ladies' College and King's College, London, and married in 1911. She was head of the department of botany at Birkbeck College, 1909-17, and held the same post, as a professor, 1921-39 and 1941-44. She wrote on the structure and development of fungi. She acted as chief controller of Queen Mary's Army Auxiliary Corps, 1917-18, for which work she was created D.B.E. in 1919. During the Second Great War she was director of the A.T.S. until 1941.

**Gyantse.** Town of Tibet, 125 m. N.E. of the Chumbi Valley. It stands, at an alt. of 13,200 ft., at the foot of a jong or fortress which, with a fortified lamasery, occupies two rocky eminences commanding a wide plain. Gyantse was held by the Younghusband Expedition, and opened to foreign trade by the Lhasa convention, 1904. It is connected with Lhasa, 144 m. N.E., by telegraph.

**Gyaro, GYAROS, OR GHIURA.** Island of the Aegean Sea. One of the Cyclades, it is a mountainous island, about 10 m. N.W. of the island of Syra. Triangular in shape, its length is 10 m., and greatest breadth about 3 m. In Roman imperial times it was a place of banishment for criminals.

**Gybe.** Nautical term for the swinging over of the mainsail boom or spanker when the wind is aft. With the wind dead aft and variable there is often a strong tendency of the mainsail to gybe, and if the operation is not carried out carefully the vessel may capsize or the mast or boom be broken.

**Gyers' Kiln.** Metallurgical furnace used for the calcining of iron ores. Designed by John Gyers, an engineer of Middlesbrough, it consists of an inner lining, about 18 ins. in thickness, of firebrick enclosed in an iron casing. The upper part is cylindrical, 20 ft. to 35 ft. in diameter, while the lower part is conical, tapering inwards to the bottom. In the centre, on the bottom, is a double cone which helps to spread the ore and fuel evenly in the kiln. Air is introduced through passages in the sides of the tapering part of the kiln and also through the spreader cone. See Furnace; Iron.

**Gyges** (7th century B.C.). King of Lydia. As a young man he became a favourite of the reigning Lydian Sadyattes Candaules, but having seized the bride of his master, and anticipating punishment, he assassinated him and seized the throne. Under Gyges Lydia became a powerful kingdom. He ultimately fell in battle against the barbarian Cimmerii (c. 650 B.C.).

**Gylippus.** Spartan general. During the Peloponnesian War he was sent to Sicily with 3,000 men to assist the Syracusans in 414 B.C. Assuming the chief command, he helped the Syracusans to destroy the Athenian besieging force. The Athenian ships were defeated in the harbour of Syracuse, while their land forces were compelled to surrender with their generals Nicias and Demosthenes. Gylippus later fell into disgrace for abstracting some of the treasure taken at the capture of Athens in 404.

**Gymkhana** (Pers. *gandkhana*, ball house). Name for a mixed sports and athletic meeting. It originated about 1860 in India, where horse and pony races were introduced as a means of recreation and amusement for British soldiers and officials. Further interest was given by including athletic events, such as tug-of-war, and military sports such as tent-pegging, as well as competitions of an amusing and less strenuous character. See Athletics.

**Gymnastics** (Greek, *gymnastikē*, training). Art of developing the body by suitable exercises. The Greek fully understood the value of all-round physical culture, and in the *gymnasia* the youth of Athens strove to approach the ideal of finely proportioned beauty as revealed in marble by their famous sculptors. From Greece the cult of gymnastics spread to Rome, where in the *Thermae* to which *gymnasia* were attached athletic exercises were practised

While active sports have always been universally popular, the science of gymnastics proper was neglected in medieval Europe, and its serious revival in modern times may be said to date from the dark days of Jena, 1806, when Prussia began to fit herself for the final struggle against Napoleon. Her example was followed by other European countries, including Great Britain.

Before long two opposing theories of gymnastics were developed. The first, based upon German practice, regarded free movements merely as preliminary to the more strenuous exercises performed with the help of apparatus, such as the horizontal bar, parallel bar, ladder and rings, weights, etc., involving feats of strength as well as of agility. The Swedish system, on the other hand, not unjustly claims that elaborate and costly apparatus, and, indeed, apparatus of any kind, is a luxury that may be dispensed with by those who desire full and all-round bodily development with the sense of physical well-being which this involves. In the 20th century Swedish methods, with adaptations, became popular in Great Britain, especially after the system of training in the British army was altered in the same direction, this resulting in a higher standard of fitness among recruits. See Drill; Dumb-bell; Eurhythmics; Indian Club; Physical Training; Swedish Drill.

**Gymnophiona** (Greek, naked snake-like ones). Group of amphibians in which the limbs have been almost completely lost so that the animals resemble worms. They are also sometimes called the Coecilia. They are found in Central and S. America, tropical Africa, and the Orient.

**Gymnosophists** (Gr. *gymnos*, naked; *sophistes*, wise man). Indian philosophical sect, remarkable for their austere method of life and indifference to pain. To purify the soul they mortified the body. They went naked, were vowed to celibacy, and believed in the transmigration of souls.

**Gymnospermae** (Gr. *gymnos*, naked; *sperma*, seed). Large class of flowering plants distinguished by having the ovules and seeds naked—not enclosed in a chamber (ovary or seed-vessel). It consists of the various families of coniferous trees—yews, pines, firs, cypresses, cedars, cypresses, etc. They usually have needle-like evergreen leaves, and the seed has normally two cotyledons with a

store of food for the seedling in each of them.

**Gympie**. Town of Queensland, Australia. It is 90 m. N.N.E. of Brisbane, and 48 m. S. of Maryborough, its port, with both of which it is joined by rly. It is the centre of an area producing gold, silver, nickel, bismuth, antimony, and coal. Pop. (1954) 9,964.

**Gynaecology** (Greek *gynē*, a woman). The subdivision of medicine which deals with diseases peculiar to women by reason of their anatomical structure. Closely related, and indeed indivisible, is the kindred subject of obstetrics, the art of midwifery. The earliest gynaecologists certainly would be the women of a primitive tribe practising midwifery, for they

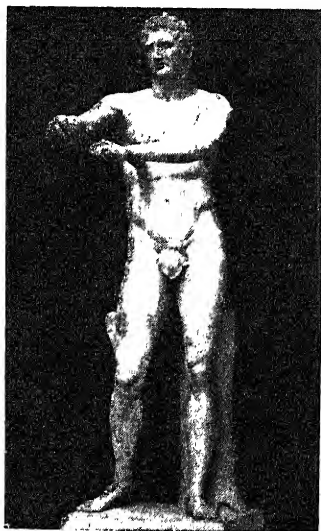
variety of instruments used by them. The O.T. has many references to gynaecological and obstetric conditions.

Before the time of Hippocrates ignorance of physiology and anatomy retarded the growth of medicine, and as late as the 2nd century A.D. a text-book on gynaecology makes no mention of female structure. Until the 19th century little progress in knowledge was made and very little new treatment introduced, but with the striding forward of medicine and surgery, the specialised study of gynaecology was to flourish. See Caesarian Section; Obstetrics.

**Gynandromorphism** (Greek, woman-man in form). Term used in biology. The recognizable maleness or femaleness of an animal may depend on the responses of parts of the body to the presence of sex hormones. Which hormone is produced—male-determining or female-determining—depends upon the genetic make-up of the individual concerned, i.e. whether it carries one or two of a particular kind of chromosome (X chromosome). In other forms, notably the insects, this is not so. In these the recognizable maleness or femaleness of the individual depends upon the different results of direct gene action in the cells of different parts of the body, though all the cells have the same gene outfit in the normal condition.

It sometimes happens in insects that during a division of the cells early in the development of an individual from an egg, there is abnormality in the distribution of X chromosomes: early cells have too many, too few, or no X chromosomes. In the parts of an individual in which this mishap has occurred, there will be a difference in those qualities we use to diagnose the sex of the individual. The creature will be a sex-mosaic in space. For this condition the name gynandromorph should be reserved. Artificial gynandromorphs can be made in those forms in which the appearance of maleness and femaleness is due to the hormones, by injecting or implanting small doses of the relevant hormone which act only near the site of injection. Gynandromorphs should be sharply distinguished from intersexes. See Intersex.

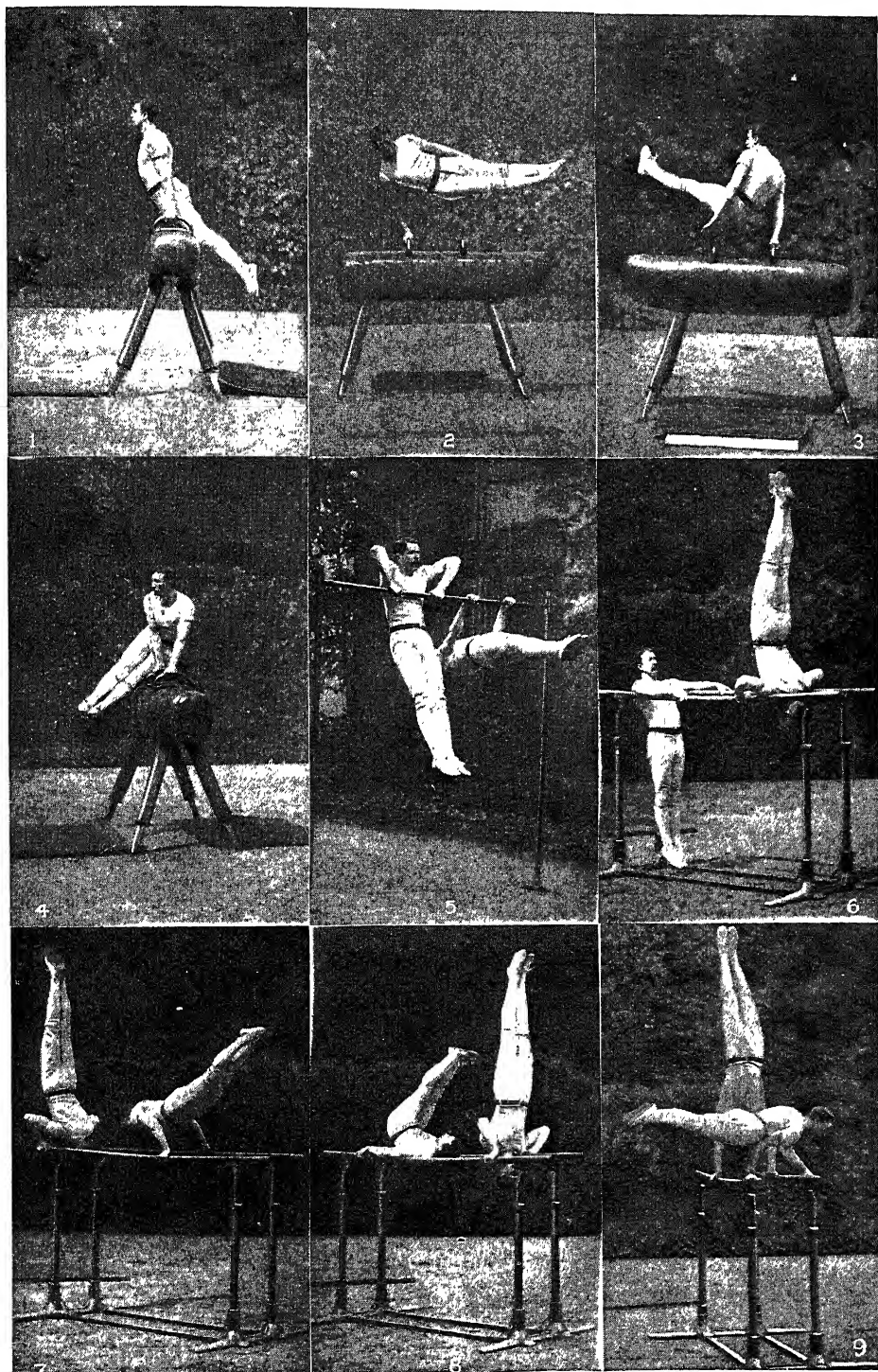
**Gyöngyös**. Town of Hungary, in the co. of Heves. It is on the Gyöngyös river, 45 m. N.E. of Budapest. The town is noted for its Franciscan monastery. A thriving trade is carried on in



**Gymnastics**. Statue of Greek athlete using bronze scraper to cleanse his skin after exercise. It is regarded as typifying the ancient Greek ideal of physical fitness  
Vatican, Rome

would be most conversant with the phenomenon of menstruation and with miscarriage and delivery.

The first real facts about gynaecological medicine are found in old Egyptian papyri. The Kahun papyrus, c. 2000 B.C., deals with gynaecology and veterinary medicine. As in all early documents, surgery is not mentioned. The Ebers papyrus, supposed to have been found in the necropolis at Thebes, dates from 1550 B.C. and shows much advance in knowledge and in skill, although interlarded with superstition and magic. In Babylonian-Assyrian times no further advance is noted. The Hindus excelled in surgical technique, and we have evidence of the large



1. The horse: front rest position. 2. Flank vault, left. 3. Rear vault, left. 4. Right double feint; from the rest the gymnast swings both legs clear over croup, returns without pause, and vaults left. 5. Horizontal bar; left, bent arm rest; right, front lever position, a

difficult exercise. 6. Parallel bars: left, upper arm rest; right, double shoulder-stand. 7. Left, bent arm handstand; right, front lever in rest. 8. From right shoulder-stand, on right, to position on left. 9. Handstand and, in front, right elbow lever

**GYMNASTICS: EXERCISES ON VAULTING HORSE, HORIZONTAL AND PARALLEL BARS**



cereals and a choice wine is made. Manufactures include copper goods, bricks, and tiles. Pop. 21,281.

**Győr.** City and county of Hungary, previously also known by the German name of Raab. The city, formerly a royal Hungarian free city, stands 87 m. W.N.W. of Budapest, at the confluence of the river Raab with the Little Danube, on the site of the ancient Roman Arrabona. Its chief buildings are the handsome town hall, the 15th century bishop's palace, and the cathedral, dating from the 12th century but rebuilt in the 17th. Pop. (1955 est.) city, 66,000; county, about 130,000.

**Gyp.** Pseudonym of the French writer Sybille Gabrielle Marie Antoinette de Riquetti de Mirabeau, comtesse de Martel de Janville. See Martel, Comtesse de.

**Gyp.** Name given to a male servant of resident members of a Cambridge college. The counterpart at Oxford is scout. The gyp is assisted by a woman, usually his wife, who is called a bedmaker. The name has been humorously derived from Greek *gyps* (vulture), with reference to a supposed voracity in snapping up perquisites. *Pron.* Jip.

**Gypsies.** The people known in the U.K. as Gypsies, or Gipsies, and elsewhere by a variety of names (Gitanos, Zigeuner, Tchingianés, Zingari), call themselves *Romá* men. Large bands of these nomads appeared in Western Europe about 1417, though there is evidence that smaller parties wandered W. before that date. They came from the Balkan peninsula, where their tribes are still met with in considerable numbers. Rüdiger in



Gypsies. Group of Serbian Gypsy children. Top, typical family from Rumania

1777 and Jacob Bryant in 1785 announced the discovery of their ultimate origin from India.

Interest in Gypsies was fostered by the writings of George Borrow, but the serious study of the problem of their origin was first undertaken on the Continent. A. F. Pott, of Halle, published in 1844 his *Die Zigeuner in Europa und Asien*, in which he displayed the grammar and vocabulary of Romani, tracing the bulk of the words of Indian origin by means of parallels from Sanskrit and modern Indian tongues. At the same time he noted a number of words borrowed from Greek, Hungarian, German, and other languages, picked up by the Gypsies in their wanderings. F. Miklosich extended and corrected Pott's work in his *Über die Mundarten und die Wanderungen der Zigeuner Europas* (On the Dialects and Wanderings of the Gypsies of Europe), 1880. He proved conclusively that the route taken by the Gypsies after

leaving India lay through Armenia and across Asia Minor to the Balkans, where they must have remained for some centuries. On reaching the west they professed to be pilgrims from Egypt, hence the name by which they are known. The story was pure fiction, but it secured for them a freedom to travel which they soon abused, bringing upon themselves much savage persecution.

#### Gypsies in England

England perhaps has the cleanest record in this respect, but it is still sometimes believed that Gypsies commit the crime of stealing children. No case of this has ever been proved with evidence sufficient to satisfy an impartial mind. They are thought to be a distinctly criminal element in the population, yet an analysis of charges brought against Gypsies (including other vagrants alleged to have been Gypsies) in England during four years showed that out of 1,682 prosecutions only 18 were for crimes such as murder, abduction, or attempted suicide, 216 for theft, burglary, and receiving stolen property, 349 for assaults, drunkenness, obscenity, and using threats, and 76 for cruelty to horses, to children, desertion of wife, and begging. The remaining charges were for poaching, fortune-telling, and stealing wood, and for minor offences such as damaging turf, making fires too near the road, driving without lights, hawking without licence, etc., many of which are incidental to the Gypsies' manner of life. The comparative absence of serious crime among a class of the community variously estimated to number anything between 15,000 and 45,000, proves the baselessness of popular opinion on the subject.

In the matter of cleanliness Gypsies are often confused with other caravan-dwellers. The true Gypsy is, as a rule, more scrupulously cleanly than the average English peasant. This may to some extent be attributed to superstition. A plate from which a dog has eaten will not again be used for the preparation of human food. It has become *mokhadi* (defiled). This ceremonial defilement attaches to vessels used by a woman in child-birth, and to female underclothing, though these customary ideas vary from one family to another. A strange custom is that of burning the van and all the belongings of a deceased Gypsy. The idea behind this may be the fear of ghosts, a fear prevalent among Gypsies.



Gypsies are hospitable, and full of humorous and quaint sayings. The fortune-telling, the so-called Gypsy kings and queens, and the assumption of ancient lineage from the Pharaohs are all pretence for the bewilderment of the too credulous *gadzhos*, "non-gypsy." To what particular section of the population of North India Gypsies are most nearly related, as well as the occasion and date of their emigration from that country, are problems that remain to be solved.

F. G. Ackerley

**Bibliography.** Dialect of the English Gypsies, B. G. Smart and H. T. Crofton, 1875; Dissertation on the Gypsies, H. M. G. Grellmann, 1807; The English Gypsies and Their Language, C. G. Leland, 1874; In Gypsy Tents, F. H. Groome, 1880; Gypsy Folk Tales, F. H. Groome, 1899; The Story of the Gypsies, K. Bercovici, 1929; the works of George Borrow; Aylwin, a Welsh romance, T. Watts-Dunton.

**Gypsophila** (Gr., chalk-loving). Hardy perennial plants of the family Caryophyllaceae. Natives of India and Asia, they thrive well if given the ordinary treatment for annual plants. The tiny flowers are white or pink in colour. The plants prefer a dry and well-drained soil, and will not succeed in damp or sunless situations. They are chiefly grown for the use of their foliage in blending bouquets, and were introduced into England in 1759.

**Gypsum.** Mineral, a hydrous calcium sulphate,  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ , containing 32.5 p.c. lime, 46.6 p.c. sulphur trioxide, and 20.9 p.c. of water. It occurs in nature as a soft, white rock, usually associated with rock salt. Gypsum beds in sedimentary rocks have often been formed by evaporation of enclosed sea basins.

Selenite is the variety of gypsum which occurs in distinct crystals, occasionally three to four feet in length. The crystals belong to the monoclinic system, have a pearly, shining, lustrous surface, and can readily be split into thin, transparent sheets. Satin spar is the name given to a fine fibrous variety of gypsum having usually a pearly, opalescent appearance. Red or yellow tinted satin spar is coloured by ferruginous impurities. Alabaster is a fine-grained, compact variety of gypsum, resembling marble in appearance.

Gypsum is found in England, notably near Derby and Carlisle and in Notts and Cheshire; in France, near Paris; in numerous places in the U.S.A.—one of the largest deposits being in the Great

Salt Lake, Utah; and in smaller deposits in Europe and Africa.

When heated to 115° C. gypsum loses more than half its water and is converted to a white powder, plaster of Paris. This is used for plasters, plasterboard, and mould making in pottery works. Alabaster, the most celebrated variety of which comes from Volterra in Tuscany, is used for decorative work, vases, statuettes, etc. Quantities of gypsum are used in the preparation of cements, fertilisers, as a basis of paints, and for making imitation marble; as a flux in smelting nickel ores; and for improving water for beer.

**Gypsy-wort** (*Lycopus europaeus*). Perennial herb of the family Labiatae. It is a native of



Gypsy-wort. Stem with flower whorls situated above each pair of leaves

Europe, and N. Africa, of Asia, Australia, and of N. America. It possesses a creeping rootstock, tough, four-angled stem, and pairs of opposite and elliptical leaves with margins deeply cut into coarse teeth. The small bluish-white flowers, dotted with purple, are crowded in whorls round the stem, just above each pair of leaves. It grows on banks of streams and ditches, and the juice makes a rich brown stain.

**Gyrfalcon.** This is another spelling of Jer-falcon (*q.v.*).

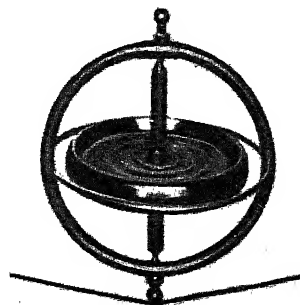
**Gyron** (Fr.). In heraldry, a wedge, formed by a diagonal line from the dexter chief meeting a horizontal line in the fess point. It is one of the sub-ordinaries (*q.v.*). When a shield is divided by a series of wedges it is said to be gyronny. Usually there are eight gyrons, but there may be only six, or as many as sixteen. Such irregularities should always be specified.



Gyron in heraldry

**Gyroplane** or **ROTAPLANE.** Heavier-than-air flying machine supported in flight by the reaction of the air on one or more freely rotating rotor blades. This class of aircraft, of which the Autogiro (*q.v.*) is an example, is distinct from the helicopter (*q.v.*), in which the rotor blades are power-driven while the machine is in flight.

**Gyroscope** (Gr. *gyros*, ring. circle; *skopein*, to look). Rotatable wheel supported on a balanced



Gyroscope in its simplest form. While spinning, the top remains steady on the string

frame which can rotate freely about any axis. A working gyroscope consists of a heavy flywheel spinning at high speed and supported in a ring with an axis at right angles to the plane of the wheel. The inner ring is then set in a second ring which has an axis at right angles to it. The whole instrument is supported on a stand which allows the outer ring to move in its axis. The flywheel and rings are so arranged that the three axes of rotation in any position pass through a fixed point, which is the centre of gravity of the wheel. Thus the wheel can rotate about three mutually perpendicular axes.

The property of the gyroscope depends upon the fact that if a body, symmetrical about an axis of greatest or least moment of inertia, is set rotating about that axis, then the direction of the latter remains unchanged in space unless external forces are applied. Spinning the wheel at high speed imparts to it great angular momentum, so giving to the wheel a much greater apparent inertia to changes in direction of its axis of spin than when stationary.

In the absence of any external forces, the rotating axis will preserve a fixed direction in space. If a torque is applied to the frame which tends to alter the plane of spin of the wheel, the latter turns about an axis at right angles to that about which the torque is applied, until the plane direction of spin of the wheel coincides with the plane and direction of the torque. This phenomenon is known as precession. If the torque rotates with the precession, the latter becomes continuous. Should the base of the gyroscope be tilted in any position out of the



perpendicular, the wheel continues to revolve on an axis at right angles to the vertical plane of the perpendicular.

The gyroscope was first put to practical use by Léon Foucault to demonstrate the rotation of the earth. If the axis of a gyroscope is initially pointed to some star and the flywheel kept rotating rapidly, the axis remains pointed at the star irrespective of the earth's rotation.

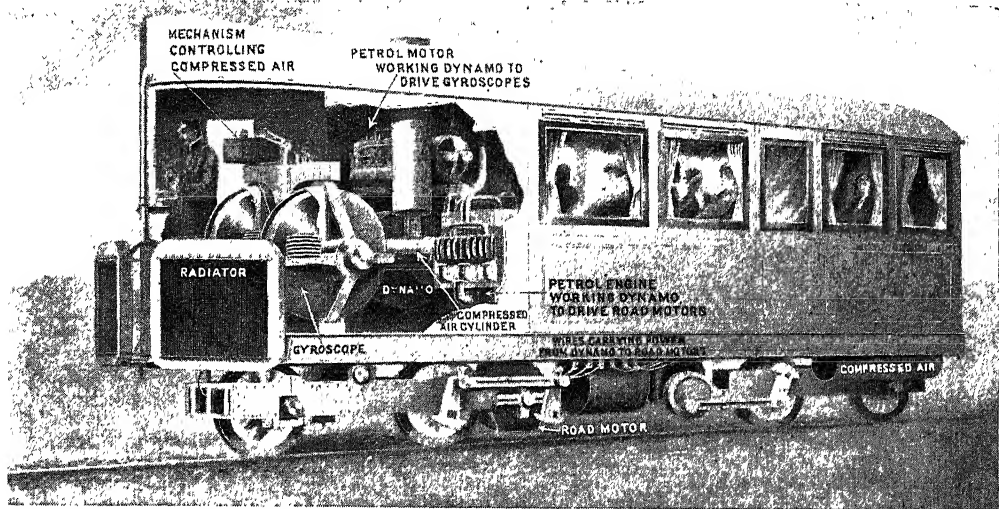
Foucault's gyro-telescope developed into the gyro-compass. So long as the rotation of the wheel of the gyro-compass is maintained, the axis, if originally pointed to the Pole star, will

when firing at a target. Torpedoes are fitted with gyroscopes to keep them on a steady course after they have been fired; for this purpose the gyroscope is connected to the rudder and elevators, coming into operation as the torpedo leaves its tube.

Gyroscopic track recorders on railways record automatically the condition of the rails. A pendulum is connected to a gyroscope, which remains unaffected by the train's movement when rounding curves or altering speed. Attached to the pendulum is a needle, and as the pendulum seeks to remain vertical, the latter traces on a graph divergences of the rails,

or heavy-oil tractor mounted on two caterpillar tracks at the rear with a single broad wheel in front for steering. The plough and harrow are carried at the rear of the tractor. The plough is of the rotary type and has four shares; the harrow is mounted behind, and plough and harrow can be raised above ground level when the tractor is moving by road. The gyro-tiller can complete an acre in one hour, and is provided with lights which enable it to work as quickly and efficiently at night as by day.

**Gythium.** Ancient Greek city, in Peloponnesus. It stood at the mouth of the river Gythius, on the



**Gyroscope.** Diagram illustrating the mechanism and construction of the Brennan monorail, which owes its stability on the rail to the use of gyroscopes

remain in that direction, and, unlike the magnetic compass, is unaffected by variations due to steel in a ship's hull or cargo. A gyro-compass on a liner has a wheel weighing over 50 lb. and is driven by an electric motor at 5,000 r.p.m. Another application of the gyroscope to navigation is the automatic pilot (*q.v.*) used on aircraft. The gyroscope, connected with the controls, automatically keeps the aircraft on its pre-set course. A similar but larger device keeps a ship on her course and corrects any tendency to yaw.

Gyro-stabilisers, which weigh up to 100 tons, with wheels revolving at 1,400 m.p.h., reduce the rolling of ships in a seaway; the natural tendency of the spinning wheel to maintain its revolutions in the original plane partially counters the ship's alternate list to starboard and to port. Gyro-stabilisers keep warships steady

inequalities in the bed of the track, and differences in the level of the rails.

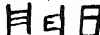
The gyroscope enables the monorail vehicle to remain upright. Pendulums on each side of the gyroscope cause a ratchet to engage with a cog-wheel on the gyroscope's axle immediately the car leans to one side or the other. This restores the car to the vertical position by accelerating the precession of the gyroscope to the vertical. The first monorail was built by Louis Brennan and the device exhibited before the Royal Society in 1907.

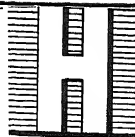
Gyroscopes kept the German flying bombs of the Second Great War on their course, and provide the stabilising factor in unmanned aircraft and tanks.

**Gyro-Tiller.** A power-driven agricultural machine for ploughing and harrowing in one operation. The power unit consists of a petrol


N.W. shore of the Bay of Laconia, 27 m. S.E. of Sparta, whose port it was. As the headquarters of the Spartan fleet it was often attacked; the Athenians burned it in 455 B.C. It was a member of the Achaean League (*q.v.*) from 195 B.C. until 146 B.C. Excavations have brought to light the remains of a Greek theatre and Roman ruins, but much of the ancient city lies beneath the sea. Marathonisi is the modern town.

**Gyula.** Town of Hungary, the capital of the co. of Békés. It stands on the White Körös river, which bisects the town, and is 36 m. N.N.W. of Arad. Formerly strongly fortified, it has a museum containing antiquarian relics, the ruins of an old castle, and a château. There is trade in wine, oil, flour, and spirits, while cattle are reared in the neighbourhood. Turtles are caught in the surrounding swamps. Pop. 25,221.

**H** THE eighth character of the English alphabet, held the same position in the North-Semitic, Greek, Etruscan, and Latin alphabets. The North-Semitic letter, called *heth* (or *kheh*), was written  and had the sound of a strong aspirate, or rather a guttural, rough breathing sound *h*: this is also the modern use in Hebrew and Arabic. In the early Greek alphabets the letter was adopted to represent the long *e*-sound, i.e. the *ēta* (in the Eastern alphabets) or the aspirate (in the Western alphabets). In



the classical Greek alphabet the *h* took the form *H* and it was in this form that it was taken into the Latin and the modern alphabets.

The greater speed which came with subsequent developments in hand writing resulted in the scribe's endeavouring to complete a character without removing his pen from the paper. Thus developed the Latin cursive form *h* with its uncial equivalent  forerunners of the minuscules *h* and *h*.

**H** Eighth letter of the English and Latin alphabets. By some it is regarded as a consonant, by others as a mere aspiration.

It had an aspirate value in the Etruscan and Latin alphabets. In Rome its pronunciation was neglected by the common people (just as it is often today in England and elsewhere), and Catullus pokes fun at Arrius, who tried to be correct, but always succeeded in getting his aspirates in the wrong place. In Italian and Spanish the *h* is written to indicate a modification of the preceding consonant but never as an aspirate. In French the letter *h*, though never sounded, is sometimes "aspirate" (e.g. *l'homme*, *la houle*). In English the *h* may be a strong aspirate (as in "half"), a weak aspirate ("as in while"), or silent (as in "honour").

**H**. In music, the German name for B natural (B being reserved in German for B $\flat$ ). Thus, Schubert's famous Unfinished Symphony in B minor is called in Germany the symphony in H moll; and Liszt wrote a fugue on the notes in the name Bach.

**Haakon I** (915-961). King of Norway, c. 938-961, known as Haakon the Good. Youngest son of Harold Haarfager (Fair-

Hair), he was brought up in England as a foster-son of king Athelstan. After his father's death he was furnished with ships by the English king and sailed for Norway. Having defeated his half-brother, Eric Blood-Axe, Haakon was proclaimed king. He was killed in 961, whilst repelling an invasion by the sons of Eric.

**Haakon IV** (1204-63). King of Norway, 1223-63, known as The Old. He brought Iceland and

Greenland under the Norwegian crown. He was defeated by Alexander III of Scotland at Largs in 1263 and died at Kirkwall, Orkney.

**Haakon VII** (1872-1957). King of Norway from 1905. Second son of Frederick VIII of Denmark,



Haakon VII,  
King of Norway

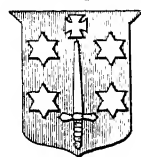
he was born Aug. 3, 1872, and christened Carl. On July 22, 1896, he married Maud (1869 - 1938), youngest daughter of the prince of Wales (Edward VII). On the separation of Norway from Sweden in 1905, he was chosen king by the Norwegian storting and assumed the name Haakon VII. His only son Alexander (b. 1903) became crown prince, with the new name Olaf. Haakon's reign was uneventful until, on April 9, 1940, the



Germans invaded Norway. The royal family with the government left Oslo for Hamar. When the king refused to appoint an administration favourable to the Nazis, his headquarters was bombed. Following the Allied with-

drawal from Trondheim, the king proclaimed that he would not treat with the Germans before their complete evacuation. He sailed in a British warship to London on June 10. In 1941 he approved his government's decision to restore the death penalty for crimes against the state, a measure aimed at the Quisling government. Haakon received a tumultuous welcome on his return to Oslo, June 7, 1945. He died Sept. 21, 1957, and was succeeded by his son, Olaf VI.

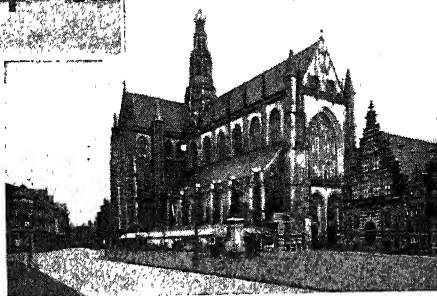
**Haarlem**. Town of the Netherlands, capital of the prov. of North Holland. It is



Haarlem arms

about 14 m. W. of Amsterdam, on the Spaarne, and is well served by rly. Industries are small, cotton weaving, bleaching and dyeing, printing, and type-founding being the chief; but the town is famous as the centre of a bulb growing region which supports a large exporting industry.

Haarlem possesses many architectural and artistic treasures. Its chief features are the Grootte Kerk, on the market place, a large cruciform church of the late 15th century, with a tower over 250 ft. high; the town hall, a 13th-century castle many times restored; and a museum occupying a hospice built in 1608 and containing a superb collection of paintings by



Haarlem. The Grootte Kerk or Great Church, with the old Meat Market on right. Top, left, the Town Hall

Frans Hals; the Teyler museum, antiquarian, geological, and artistic; the old meat market, one of the most beautiful buildings in Holland, built 1602, now used for the archives; and small museums of colonial industries and of industrial art. In the market place is a statue to L. J. Coster (*q.v.*).

Haarlem was the seat of William, 1st count of Holland, and suffered a terrible massacre after resisting for seven months a siege by Frederick of Toledo, 1572-73. Retaken by William of Orange in 1577, it prospered in the 17th century. Pop. (1955) 166,154.

**Haarlemmermeer** (Haarlem Lake). District of the Netherlands, in North Holland. Lying to the S. of Haarlem, this district is among the largest of the Dutch *polders*, or reclaimed lakes or morasses. It was formed by pumping away the water of a large lake formerly covering more than 66 sq. m. Work was carried out by the state during 1840-53, the greater part of the cost being met by the sale of reclaimed land. The district thus saved covers about 72 sq. m., and is fertile and well tilled. The chief villages are Aalsmeer, Nieuw Vennep, Hoofddorp, Zwanenburg, and Badhoevedorp. Pop. (1955) 40,392.

**Haabakkuk.** One of the minor prophets of the O.T. His work was contemporaneous with that of Jeremiah. He lived at the time when Judah was invaded by the Chaldeans, and taught that they were the instruments of God to punish the Jews for lawlessness. His book consists of two chapters of prophecy and a lyrical hymn.

**Habbaniyah.** Former R.A.F. base in Iraq, about 60 m. W. of Bagdad. During the Iraqi rebellion led by Rashid Ali, troops opened fire on the aerodrome and cantonment on May 2, 1941, destroying several aircraft. R.A.F. bombers attacked the rebel positions and frustrated an attempt by the Iraqi air force to raid the aerodrome; but the British station was besieged until May 6. The aerodrome suffered slight damage by German aircraft from Syria. The base was evacuated by agreement with the Iraqi govt. in 1956.

**Habeas Corpus** (Lat., have the body). Term of English law. It forms the opening words of various writs, e.g. *Habeas Corpus ad faciendum et recipiendum*, to remove a cause from a lower court; *Habeas Corpus ad prosequendum*, to remove a prisoner to the proper jurisdiction. But the most famous, the safeguard against arbitrary im-

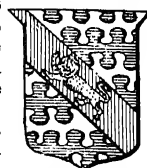
prisonment, is the high prerogative writ of *Habeas Corpus ad subjiciendum*. It is addressed to one who detains or imprisons another, and commands him to "have the body" of the person in the court of king's bench on a certain day, together with the cause of his detention. If the court decides that the cause shown does not justify the detention it orders a release.

The writ is as old as the common law itself; but in 1679 it was thought proper to pass the Habeas Corpus Act, to prevent certain evasions of the law which had sprung up under the arbitrary Stuart kings; e.g. after the receipt of the writ by one gaoler, the government would remove the prisoner to another gaol, and then the first gaoler would make answer that he no longer had the body of the prisoner, and therefore could not produce it in court. Again, judges sometimes refused to hear applications for the writ. These and other evasions were made punishable; but the Act applies only to criminal cases. In addition, the writ is used where, for instance, a child is detained from its father or mother or other lawful guardian; and was used by the friends of Mrs. Jackson in the celebrated case where it was decided that a husband has no power to detain his wife against her will. In times of national emergency the Habeas Corpus Act may be suspended by a special Act. It is also suspended automatically where martial law (*q.v.*) obtains.

**Haber, FRITZ** (1868-1934). A German chemist. Born at Breslau, Dec. 9, 1868, he studied chemistry at Heidelberg and Berlin, and worked as an unpaid clerk in laboratories in Zürich and Jena before becoming a lecturer at the Karlsruhe polytechnic in 1894. His work on electro-chemistry, thermo-dynamics, and the chemistry of gases earned him a professorship there in 1898, and the chair of physical chemistry in 1908. Between 1908 and 1910 he evolved the extremely important process for the synthesis of ammonia from atmospheric nitrogen which bears his name, and which was exploited on a commercial scale by the German dye trust at Ludwigshafen and Leuna. Haber became director of the Kaiser Wilhelm institute of physical chemistry at Berlin in 1911, and in 1918 received the Nobel prize for chemistry. Forced to resign in 1933 on account of his Jewish blood, he emigrated to Switzerland, where he died at Zürich on Feb. 1, 1934.

**Haberdasher.** Word used for a retail trader who sells articles such as pins and needles, buttons, and other accessories of dress, i.e. what are known as small wares. Today haberdashery is merely a branch of the drapery trade. The word is an old one, and its origin and early meaning are uncertain.

**Haberdashers' Company.** The eighth of the twelve chief London city livery companies. Incorporated 1447, it



Haberdashers' Company arms

was originally a branch of the Mercers', with S. Catherine the Virgin and S. Nicholas as patron saints. Haberdashers' Hall in Gresham Street, E.C., was built on a site bequeathed in 1478 by William Bacon. The first hall was burnt with the archives in 1666; the second, by Wren, partly burnt in 1864, was destroyed in the German fire raid of Dec. 29-30, 1940. A new hall on the same site was opened in 1956. The company manages several almshouses and schools.

**Habibullah Khan** (1871-1919). Ameer of Afghanistan. Son of Abd-ur-Rahman, whom he succeeded Oct. 3, 1901, he reduced taxes, set up a council of state, and tried to associate tribal chiefs with provincial governors in justice. Although loyally observing the agreement with the government of India regarding foreign affairs, he jealously preserved Afghanistan's right to manage her own trade. Having paid a state visit to India in 1907, he accelerated his programme of westernising Afghanistan; and against the conservative majority, introduced motor cars, telephones, newspapers, and hydro-electric power, and established a high school at Kabul. In the First Great War Habibullah maintained neutrality and was a loyal friend of Great Britain despite the arrival of a German mission with gold and promises. Equally unsuccessful were the efforts of the Turks to persuade him to join a crusade for Islam. He was assassinated Feb. 20, 1919, by the anti-British party, and succeeded by his brother Nasrullah Khan, who six days later was deposed by Amanullah Khan (*q.v.*).

**Habit** (Fr. *habit*, Lat. *habitus*, dress). Outer garment, such as the riding dress of a woman or the frock of a monk, that is distinctive of special occasions or avocations. See Costume.

**Habit** (Lat. *habitus*, state, manner). A fixed disposition or condition of mind or body resulting from frequent repetition of the same behaviour, so that the accustomed sequence of actions tends to be performed automatically upon experience of its usual stimulus. Most ordinary actions of daily life are partly habitual. Habit is beneficial to the individual in so far as it relieves him from concentrating his attention at each performance of an activity, but its mechanical nature is likely to hamper initiative. The first result of habit is that it enables repeated acts to be carried out with greater facility and promptitude; secondly, as the effort needed grows less, the consciousness of these acts is weakened; thirdly, the repetition brings about an inclination to reproduce them which in obsessive types becomes a compulsion. Ability to form fixed habits varies greatly in individuals. The tendency to cling to them increases with age. Habits are often confused with conditional reflexes, but differ because (1) they start as ordinary conscious behaviour; (2) except where compulsive, they can be controlled once attention is directed to them.

**Habit and Repute.** Term used in Scots law. In Scotland, if a man and a woman live together openly, i.e. by habit and repute, the courts of law will, if desired, give a declaration that they are legally married. The term is also applied to what are known as habitual criminals.

**Habitant** (Lat. *habitare*, to inhabit). Name given to the original settlers at Quebec and still applied to farmers. They have a marked individuality, speak a patois of their original French, and have their own literature, the principal authors being Fréchette, De Gaspé, and the Abbé Casgrain.

**Habitual Criminal.** As defined by the Prevention of Crimes Act, 1908, one who, after attaining the age of sixteen, was at least three times convicted of crime, and who was leading persistently a dishonest or criminal life. Such persons, if again convicted of a serious offence and sent to penal servitude, might also be sentenced to preventive detention for 5–10 years. Under the Criminal Justice Act, 1948, the term was changed to persistent offender, and the methods of punishment extensively altered. See Persistent Offender; also Borstal System.

**Haboob.** Name applied to a dense whirling dust-storm typical of N. and N.E. Sudan. Haboobs

may occur at any time of the year, but are most frequent in the neighbourhood of Khartum during afternoon and evening between May and Sept. The dust is often carried up to several thousand feet, darkening the sky. A strengthening of wind and a drop in temperature usually accompany the passage of a haboob. The storm is believed to be due to currents of comparatively cold air undercutting warm air. See Dust-storm.

**Habsburg.** Alternative spelling of the name of the Austrian house of Hapsburg (*q.v.*).

**Hacha, EMIL** (1872–1945). A Czech lawyer and politician. Born July 12, 1872, at Trhove Sviny, Bohemia, he attended the Charles university of Prague and became a lawyer. He was legal adviser to the land committee of Bohemia, 1898–1916, and a counsellor of the Austrian court of administration, 1916–18. At one time a judge at The Hague, he was president of the senate of the supreme court of administration at Prague, 1925–38. After the Munich agreement he was elected president of Czecho-Slovakia, Nov. 30, 1938. When the Germans virtually annexed the country next year, Hacha was appointed by them a puppet president of Bohemia and Moravia, in which post he advised cooperation by the Czechs with Nazi officials. On May 5, 1945, the defeat of Germany in the Second Great War being imminent, he was arrested by patriots in Prague and ordered to stand trial as a war criminal, but before this took place he died in a prison hospital on June 27. See Czecho-Slovakia. *Pron.* ha-ha.

**Hachette.** Name of a firm of publishers and booksellers. Founded in Paris in 1826 by Louis Christophe François Hachette (d. 1864), primarily for the publication of classical works, the house now issues general literature and the Joanne series of French and English guide-books. The firm has over 1,500 rly. bookstalls in France and branches in the French colonies, Egypt, Turkey, Rumania, and S. America. The London branch, established 1859, has produced a series of works for the study of French, German, Spanish, Italian, and other European languages. The Paris house is at 79, Boulevard Saint-Germain, and the chief London house at 16–17, William IV Street, W.C.2.

**Hachioji.** Town of Japan. In the island of Honshu, it is 25 m. W. of Tokyo. Silk-worm rearing and silk-weaving are the principal industries. Pop. 62,279.

**Hackensack.** A city of New Jersey, U.S.A., the county seat of Bergen co. It stands on the Hackensack river, 12 m. N. of Jersey City, and is served by rlys. and an airport. It makes aeroplane parts, clothing, chemicals, bricks, and cement. Founded as a Dutch trading post in 1647, it played a part in the War of Independence, both armies having camped on its green and Washington having led hence his retreat across New Jersey in 1776. Notable buildings include a Dutch church, 1696. Incorporated 1868, Hackensack was chartered as a city in 1933. Pop. (1950) 29,219.

**Hackenschmidt, GEORGES** (b. 1877). Russian wrestler, born July 20, 1877, in Estonia. After a successful career on the Continent he came to England about 1901, and appeared at the Tivoli and other music-halls, where his immense strength and magnificent physique made him extremely popular. In 1904 he beat Jenkins at the Albert Hall, and in 1906 won the championship from Madrali, the Terrible Turk, at Olympia. Hackenschmidt's measurements were: height, 5 ft. 8 ins.; weight, 14 st. 10 lb.; neck, 22 ins.; chest, 52 ins.; biceps, 18 ins.; calf, 17 ins. In 1908 he left the ring after a technical defeat by Frank Gotch, returning only for a handicap bout (a draw) against Stanislav Zbysoc in N.Y. In later life he wrote and lectured on philosophy and psychology.

**Hackett, WALTER** (1876–1944). American dramatist. He was born at Oakland, Calif., Nov. 10, 1876. In London he produced his own comedies, in most of which his wife Marion Lorne played leading parts. They included *It Pays to Advertise*, 1914; *Ambrose Applejohn's Adventure*, 1921; 77, Park Lane, 1928; *Road House*, 1932; *Espionage*, 1935; *London After Dark*, 1937; *Toss of a Coin*, 1938. In 1930 he entered into management of the Duke of York's Theatre, then opened the Whitehall Theatre the same year. He was a lessee of the Apollo Theatre, 1934–37. He died Jan. 22, 1944.

**Hackle, RED.** Plume worn in the feather bonnets of the Black Watch (42nd Highland Regiment of Foot) since 1795. During the campaign of that year in Flanders, the 11th Light Dragoons were driven back by the French. The Black Watch retrieved the position. For this exploit the Red Hackle worn by the 11th Dragoons was given by General Dundas, the British commander, to the 42nd.

**Hackney.** Breed of horse originating from a cross between the race-horse and the cart-horse, used for riding, and now bred for driving also. From the practice of hiring them out, the word acquired its application to motor or horse-drawn vehicles plying for hire. A more popular form is hack, with hacking as a term applied to hiring horses for riding. By analogy, a literary hack is a writer who will drudge for any employer. *See* Cab; Horse.

**Hackney.** Parish and metropolitan borough of London. Covering an area of 5½ sq. m., it is served by railways, and by the various forms of London Transport road services. It is bounded by Walthamstow and Leyton, N.; Poplar and Bethnal Green, E.; Shore-ditch, S.; and Tottenham, Stoke Newington, and Islington, W. It has developed rapidly since the middle of the 19th century around Mare St., Church St., Grove St., and Well St. There are a town hall, 1936, and technical institute. Electricity works were inaugurated in 1901. Hackney includes part of Victoria Park (*q.v.*), London Fields, Hackney Marshes, 339 acres, opened 1894, and Hackney Downs, 41½ acres.

The manor belonged to the Knights Templars, then to the Knights of S. John of Jerusalem, and members of noble families once had country seats here. Of the ancient church of S. Augustine, supplanted by the parish church of S. John, only the tower, and chapel of Sir Henry Rowe, 1614, remain. The district preserves memories of Archbishop Sancroft, Milton, Defoe, Gilbert Wakefield, and John Howard. The bor. forms three bor. constituencies: Hackney N., Hackney S., Hackney Central. Hackney suffered severely from air raids in the Second Great War, but model housing estates were built later. Pop. (1951) 171,342.

**Hackney Carriage.** The term originally applied to horse-drawn vehicles other than stage-coaches—*e.g.* omnibuses—standing or plying for passengers to be carried for hire in any street. Motor vehicles used for this purpose are covered by the same laws. Cabs and taxi-

cabs are thus hackney carriages. Outside London the borough or urban district council (sometimes the rural district council) grants licences to vehicles and drivers. Licences are normally for one year. In the metropolitan police district and City of London licences are issued by the commissioner of the metropolitan police, acting for the Home secretary. Horse and motor vehicles are governed by a London cab order made by the Home secretary.

**Hackston, DAVID** (d. 1680). A Scottish Covenanter. A member of a Fife family, he was present

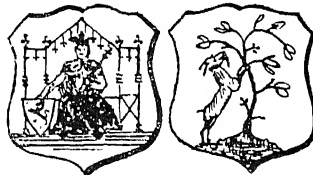


Haddington, East Lothian. Ruins of the 13th-century abbey church of S. Mary: the nave remains in use as the parish church

at the murder of Archbishop Sharp, May 3, 1679. He was one of the Covenanters' leaders at the battles of Drumclog and Bothwell Bridge. On July 22, 1680, he was captured after a skirmish at Airdsmoss, Ayrshire, and executed at Edinburgh, July 30.

**Hadad.** Name of certain Edomite kings or princes in the O.T. (1) A king of Edom, who succeeded Husham and defeated the Midianites (1 Chron. 1, v. 46). (2) An Edomite of royal blood who was taken to Egypt as a child to escape massacre at the hands of Joab, David's commander-in-chief, and later married Pharaoh's sister-in-law. At the death of David, he returned to Edom and became a troublesome enemy to Solomon (1 Kings 11, v. 14). Hadad or Adad was also the name of a Syrian deity (*see* Adad).

**Haddington.** Royal burgh and county town of East Lothian (formerly Haddingtonshire), Scotland. It stands on the Tyne, 17 m. by rly. E. of Edinburgh. The ruins of the 13th-century abbey church of S. Mary, the nave of which serves as the parish church, are surmounted by a square tower, 90 ft. high, and the choir



Haddington arms

contains the tomb of Jane Welsh, a native, the wife of Thomas Carlyle. At one time a royal residence, Haddington was the birthplace of Alexander II. John Knox and Samuel Smiles were also born here. It has one of the principal grain markets in Scotland, and manufactures woollens, agricultural implements, and other commodities. Market day, Fri. Pop. (1951) 4,497.

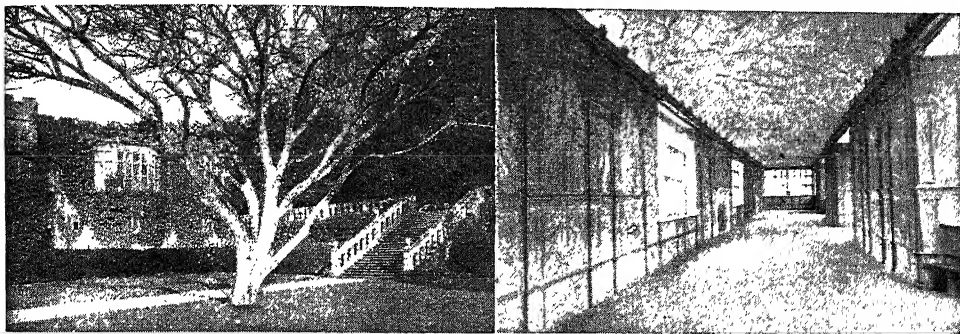
**Haddington, EARL OF.** Scottish title borne since 1627 by the family of Hamilton. Sir Thomas Hamilton (d. 1637) who, under James VI, was secretary of state, keeper of the privy seal, and president of the court of session, was made a baron in 1616 and earl of Melrose in 1619. In 1627 he exchanged his title of Melrose for that of Haddington. Charles (d. 1681), the 5th earl, married in 1674 Margaret Leslie, who became countess of Rothes. By arrangement her title passed to their eldest son, while the second, Thomas (1680-1735), became earl of Haddington. He was made hereditary keeper of Holyrood, a position which the 9th earl surrendered in 1843 in return for £40,000. This 9th earl was made a peer of the U.K. in 1827. He left no sons, so his Scottish titles passed to a cousin, George Baillie (1802-70), who took the additional name of Hamilton. In 1917 George (b. 1894) succeeded his grandfather, becoming 12th earl. The eldest son bears the courtesy title of Lord Binning.

**Haddingtonshire.** Former name of the Scottish county renamed East Lothian in 1921. *See* East Lothian.

**Haddock** (*Gadus aeglefinus*.) Common British fish of the same genus as the cod, which it generally resembles. It may be distinguished by the black line running along each side, and the black patch on either side of the body.



Haddock, a common British fish



Haddon Hall, Derbyshire. Left, part of terrace, with Dorothy Vernon steps. Right, Long Gallery or Ballroom

The haddock is usually less than 2 ft. in length, though 3 ft. is occasionally reached. Haddocks are found in shoals, and feed mainly on molluscs, small crustaceans, and the spawn and fry of other fish. They are taken in the trawl net and also on lines baited with mussels. They spawn in winter near the coast, and it is estimated that a large specimen will lay 1,500,000 eggs in the season. Economically the haddock is a most important food fish. It is largely eaten fresh, but is also split and smoked, the best qualities being known as finnon haddocks from Finnon or Findon, Kincardineshire. See Fish.

**Haddon, ALFRED CORT** (1855-1940). British anthropologist and zoologist. Born in London, May 24, 1855, he studied at Christ's College, Cambridge. He was professor of zoology in the Royal College of Science, Dublin, 1880-1901, lecturer in ethnology at Cambridge, 1900-09, and London, 1904-09, thence until 1926 reader in ethnology at Cambridge. He was president of the Royal Anthropological Institute, 1901-02. His works include *Evolution in Art*, 1895; *Study of Man*, 1898; *Head-hunters*, 1901; *Races of Man*, 1909; *History of Anthropology* 1910. Died April 20, 1940.

**Haddon Hall.** Ancient baronial mansion in Derbyshire, England. Picturesquely environed and situated on a limestone foundation above the left bank of the Wye, 2 m. S.E. of Bakewell, on the road to Derby, it passed from the Norman family of Peveril or Peverel to that of Avenell, and then, in the 12th century, to the Vernons. Towards the close of the 16th century, by the marriage of Dorothy Vernon to Sir John Manners, it passed to the Rutlands.

Maintained in a state of careful preservation by the Rutlands, though not used by them as a dwelling since the early part of the 18th century, Haddon consists of two quadrangles on different levels.

Features are the 12th-15th century chapel, 14th-17th century banquet hall, tapestried drawing-room, Elizabethan Long Gallery or ballroom—Haddon's special glory—ante-room with steps to the winter garden, tapestried state bedroom, kitchen, dining-room, Eagle or Peveril's Tower and terrace.

With the terrace steps is associated the legend of Dorothy Vernon's elopement with Sir John Manners, first mentioned in print about 1820, fostered by Eliza Meteyard and other writers of fiction, and revived by Sir Arthur Sullivan's opera, *Haddon Hall*, 1892. With Wingfield, Haddon supplied Walter Scott with materials for his picture of Martindale Hall in *Peveril of the Peak*. See Gallery; Rutland, Earl and Duke of; consult Haddon Hall, S. C. Hall, 1871; Haddon, G. Le Blanc Smith, 1906.

**Haden, SIR FRANCIS SEYMOUR** (1813-1910). British etcher and surgeon. Born in London, and

half-sister he had married in 1847. In 1880 he founded the Society of Painter Etchers. He retired from surgical practice, 1887, was knighted in 1894, and died June 1, 1910.

**Hadendoa.** Tribe of Hamitic pastoral nomads in the Nubian desert

between Suakin and the Abyssinian frontier. Their

mop-like hair earned for them the name Fuzzy-Wuzzies during the Mahdist revolt, 1882-98. Some Hadendoa groups cultivate cotton in Gash valley.

**Hades** (Gr., the invisible). In Greek mythology, properly the name of the god who ruled the underworld, also called Pluto. He was the son of Cronos and Rhea, and brother of Zeus and Poseidon. His wife was Proserpine or Persephone (*q.v.*), daughter of Demeter. Hades is represented as wearing a helmet, which had the power of rendering him invisible. He is the Roman Dis or Orcus.

In later mythology, the name Hades

came to be used for the realms of the god. These were regarded as being somewhere inside the earth. The river Styx was the boundary, and over it the dead were ferried by Charon. On the opposite shore was the three-headed dog Cerberus, the vicious guardian of Pluto's realm. Three judges judged the dead,



*S. Seymour Haden*



Sir Seymour Haden. Kilgaren Castle on the Teifi: reproduction of a typical etching by the artist

educated at University College, he studied surgery at the Sorbonne, Paris, and at Grenoble, and settled in private practice in London in 1847. While in Paris, he spent his evenings at the art schools, but did not take up etching seriously till 1858, when he made the acquaintance of Whistler, whose



namely Minos, Rhadamanthus, and Aeacus. The virtuous were sent to dwell in Elysium (*q.v.*), which is generally regarded as a separate place; in Virgil, however, it is in Hades. The place of punishment and torture was Tartarus; here were confined such malefactors as Ixion, and the Giants who rebelled against Zeus. *Prom. Haydeez. See Hell.*

**Hadfield.** This Derbyshire village is part of the borough of Glossop (*q.v.*).

**Hadfield, SIR ROBERT ABBOTT** (1858-1940). British metallurgist. Son of a steel manufacturer, he was educated in Sheffield before becoming a research metallurgist in his father's firm. He was chairman and managing director of the company before he was 30 and held both posts until his death. As the result of his experiments on the microstructure of steel and its alloys, great advances were made in steel processes. He invented the especially tough manganese steel in 1882; in 1889 came silicon steel, which with its low hysteresis makes the cores of electrical transformers. Hadfield made the first transformer with a silicon steel core in 1903.

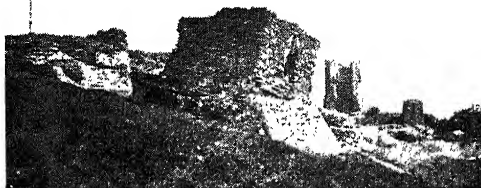
Knighted in 1908, he became F.R.S. the next year, and a baronet in 1917. He received high honours in metallurgical science from many countries, being an honorary member of the Royal Swedish Academy, the American National Academy of Sciences, and the Academy of Science of the U.S.S.R. He died Sept. 30, 1940.

**Hadham.** Two parishes of Hertfordshire, England. Great or Much Hadham is near the river Ash, 4 m. S.W. of Bishop's Stortford, and has a railway station. The manor was given by King Edgar to the bishop of London. The old palace was built about 1400; the existing mansion dates from 1780; the Early English church of S. Andrew, much restored, was erected in 1300. Pop. 1,668.

Little Hadham, formerly Hadham Parva, 3½ m. N.W. of Bishop's Stortford, has a 12th century church, with a timbered porch, Perp. tower, and a chancel restored in 1885, and is associated with the

Capel family. Near by is Hadham Hall, an Elizabethan structure. Brickmaking is a local industry.

**Hadhramaut.** A district of Arabia. Extending from the Yemen to Oman, this little-known region lies along the Gulf of Aden and the Arabian Sea, and is bounded on the N. by the Great Arabian Desert. From Aden the British exercise a certain political control over it, and it is part of the Eastern Aden protectorate, itself containing the state of Shihr and Makalla and the state of Seiyun. Its chief natural features are the Jebel Tsahura (alt. 8,000 ft.) and the great, usually dry, Wadi Hadhramaut. Some of its valleys are fertile, but it is a poor country. Shibam is its chief town, and its port is Makalla, which does a fair amount of trade. The pop. of the



Hadleigh, Essex. Ruins of 13th century castle, looking east  
By courtesy of The Salvation Army

region is estimated at 500,000, mostly Beduin. The five Kuria Muria Islands, lying off the coast towards Oman, are British, the sultan of Muscat ceding them to provide a landing for the Red Sea cable in 1854. *See Aden; Arabia.*

**Hading, JANE** (1859-1933). The stage name of Jeanne Alfrédine Tréfour, French actress, born



Jane Hading,  
French actress

Nov. 25, 1859. Her childish talent was developed in the Marseilles Conservatoire, and she was about 14 when she began to make a name at Algiers and Cairo. She was first seen in Paris in 1879, at the Palais-Royal in La Chaste Suzanne. Six years later she was engaged by Victor Karing, whom she married, at the Gymnase. Her greatest success was in Frou Frou, 1886, and she toured America with Coquelin in 1888. Associated with the Comédie Française, in 1896 she acted the

title-rôle in Sardou's *Marcelle*. She retired in 1920, and died on Dec. 31, 1933.

**Hādġ** OR HADĠI. Arabic term applied to a Muslim on his return from the pilgrimage (*hādġ*) to Mecca and Mount Arafat which is incumbent, where it is possible, on every devout Mahomedan once in his lifetime. One who has made the pilgrimage has the title *el-hādġ*, i.e. the pilgrim, prefixed to his name, and the right to wear a green turban. *See Ka'aba; Mecca.*

**Hadġin** OR HAJIN. Town of Asiatic Turkey in the vilayet of Adana. Dating from the 14th century, it lay 80 m. N. of Adana, situated at an alt. of 3,200 ft., on the southern slopes of the Anti-Taurus. Most of its pop., about 10,000, were Armenians, and a Protestant mission was established there. In 1920 the Armenians defended the town for several months against Turkish Nationalists, but at the end of Oct. it fell to the Turks, who massacred most of the inhabitants and destroyed the town.

**Hadleigh.** Parish and village of Essex, England. It is 5 m. W.N.W. of Southend-on-Sea. Fragmentary ruins remain of Hadleigh Castle, built by Hubert de Burgh, earl of Kent, in the 13th century, given by Henry VIII to Anne of Cleves, and abandoned in the 16th century. The church of S. James is Norman, with a wooden tower. The Salvation Army founded a farm colony at Hadleigh in 1891.

**Hadleigh.** Urban district and market town of Suffolk, England, situated on the Brett, 9 m. W. of Ipswich. Its railway station is a branch terminus. Hadleigh was once the centre of the woollen trade. Here Guthrum the Dane is said to have been buried. Malting and corn-milling are local industries. Market day, Mon. Pop. 2,952.

**Hadley Wood.** District of Barnet, Hertfordshire, England, partly within the urban district of Enfield, Middlesex. Its woodland area covers about 250 acres. The cruciform Perp. church of S. Mary, with ivied and turreted tower containing an old iron beacon, dates from the 15th century, and was restored in 1848-52. Part of Hadley Common was the scene of the battle of Barnet, 1471, the spot where Warwick is supposed to have fallen being marked by an obelisk, Hadley High Stone. There is a railway station. *See Barnet.*

**Hadow, SIR WILLIAM HENRY** (1859-1937). British educationist. Born at Ebrington, Glos.



Sir Henry Hadow,  
British educationist

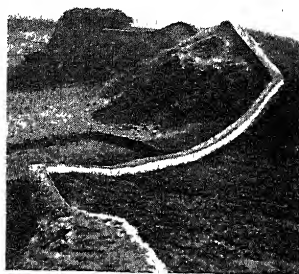
Dec. 27, 1859, he was educated at Malvern and Worcester College, Oxford, where he remained on the teaching staff until 1909. He then became principal of Newcastle college of science. Knighted in 1918, he was vice-chancellor of Sheffield University, 1919-30, and during 1920-34 chairman of the board of Education's consultative committee which, in those years, issued six valuable reports; one, on The Education of the Adolescent, became known as the Hadow report. An authority on music, he was on the R.C.M. council, and edited the Oxford History of Music (7 vols.). He died April 9, 1937.

His sister Grace Eleanor (1875-1940) was principal of the Society of Oxford home students (St. Anne's college) and was prominent in the women's institute movement.

**Hadrian** (76-138). Roman emperor, 117-138. Full name, Publius Aelius Hadrianus. Born Jan. 24, 76, at Rome or at Italica in Spain, he was brought up, adopted, and designated successor by the emperor Trajan. Hadrian believed that the Roman empire had reached its limits, and that the policy of conquest must give place to a policy of consolidation. He made peace with the Parthians, Trajan's campaign against whom had ended disastrously, and is said to have contemplated retirement from Dacia. Hadrian spent the greater part of his reign in travel. There was scarcely a province of

the empire which he did not visit. Though a voluptuary, Hadrian worked strenuously to promote the welfare of his subjects. One of his most notable reforms was the substitution of direct collection of taxes for the iniquitous system of tax-farming; he also inaugurated legal reforms, and organized for the administration of the empire a regular civil service.

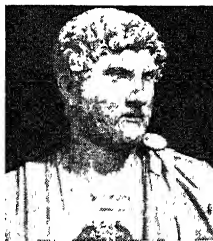
He showed outward deference to the senate, but to all intents and purposes Hadrian was an absolute ruler. He was a man of



Hadrian's Wall. Map indicating the course of the Roman wall and the forts established to defend the northern frontier of Roman Britain. Top right, part of the wall near Haydon bridge, 7 miles west of Corbridge

wide culture, and was a leader in the antiquarian movement, which sought its literary models in the past. During the last years of

Hadrian's reign occurred the last revolt of the Jews which ended with their virtual extermination in Judaea. Shortly before his death, Jan. 1, 138, Hadrian composed the well-known poem to his soul, of which more than 100 English versions exist. *Consult* Lives, F. Gregorovius, 1898; B. W. Henderson, 1923.



Hadrian, Roman Emperor  
From the bust in the Uffizi,  
Florence

**Hadrian's Villa** (Ital. Villa Adriana). Country seat of the Emperor Hadrian. It is near Tivoli (anc. Tibur), 15 m. E.N.E. of Rome. The ruins, 170 acres in extent, include the imperial palace,

baths, a Greek theatre, a stadium, colonnaded gardens, and reproductions of famous buildings seen by the emperor in his travels. Many important ancient works of art have been recovered from the site since the 18th century.

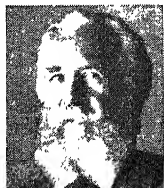
**Hadrian's Wall.** Roman frontier wall, 73½ m. long, from Bowness on Solway Firth to Wallsend-on-Tyne, England. It was built by Aulus Platorius Nepos, governor of Britain A.D. 122-126, at the command of Hadrian, who visited the country in 122. Repaired later by the emperor Severus, it was abandoned by its garrison in about 383. It was made of free-stone blocks with a core of rubble, perhaps 18 ft. high and 6-9½ ft. thick, and was accompanied by a ditch 27 ft. wide, 9 ft. deep. At intervals of a Roman mile were some 80 *castella* or mile-castles, many of which are still visible.



Hadrian's Villa, Tivoli. The so-called "Maritime Theatre," or "Natatorium," an island with a canal round it. Right, interior of the "Philosopher's Hall."

Between one mile-castle and the next were two watch-towers or turrets. Sixteen forts at intervals along the wall housed the garrison. The whole military area was delimited to the S. by the *vallum*, a wide, flat-bottomed ditch with a mound on either side. A military road ran parallel to the wall, which is scheduled as an ancient monument.

**Haeckel, ERNST HEINRICH** (1834–1919). German scientist. Born at Potsdam, Feb. 16, 1834, he studied medicine at Würzburg, Berlin, and Vienna. For a short time he practised as a physician, but, devoting himself to natural history, became in 1865 professor of zoology at Jena, where he remained till his death.



Ernst Haeckel,  
German scientist

On the publication of Darwin's *Origin of Species*, Haeckel at once became an enthusiastic convert to the Darwinian theory of evolution. In his *Natural History of Creation*, 1868, he traced the descent of man from protoplasm to the chimpanzee in 26 stages, and declared human remains found in Java to be the missing link between man and the manlike apes.

With Darwin, he maintained the hereditary transmission of acquired characters, against the views of Weismann and later biologists, and held that the most elementary forms of substance, matter, and ether possessed sensation and will. His other books, *General Morphology of Organisms*, 1866; *The Last Link*, 1898; and *The Riddle of the Universe*, 1901, all expositions of evolution, have been translated into many languages, and the last-named is accepted as a popular text-book of rationalism. In it Haeckel claimed to have demonstrated by his theory of monism the non-existence of a personal God, of free will, and of the soul of man after death. In Oct., 1914, he signed the letter of the German scientists declaring Germany to be free of any blame for the outbreak of war. He died Aug. 8, 1919. A biography by W. Bülsche was trans. by J. McCabe, 1906. See *Evolution*; *Pithecanthropus*.

**Haematite** or **HEMATITE** (Gr. *haimatitēs*, blood-like), **SPECULAR IRON**, OR **KIDNEY ORE**. Important ore mineral of iron, one of the most widely distributed accessory minerals in the earth's crust. Haematite is ferric oxide ( $\text{Fe}_2\text{O}_3$ ;

70 p.c. iron) crystallising in the hexagonal-rhombohedral system;  $\text{H}_2\text{O}$  may be present in the fibrous and earthy varieties. It may occur as steel-grey tabular or rhombohedral crystals with a metallic lustre, often splendent (specular iron); foliated and micaceous (micaceous haematite); as brownish-red to black radiating fibrous masses, often with a smooth mamillated surface (kidney ore); as a red, earthy, or ochreous variety often mixed with clay (reddle or red chalk), sand, or other impurities and grading into clay ironstone or argillaceous haematite. All varieties give a characteristic cherry-red to reddish-brown powder and streak.

Haematite has an almost universal distribution. It forms by the alteration and weathering of other iron bearing minerals such as siderite, limonite, magnetite (see *Gossan*); haematite (and limonite) in small quantities are the common pigmenting agent in sedimentary and other rocks, and in many red-brown minerals. It is deposited as a primary mineral in igneous rocks; in hydrothermal veins; as a sublimate due to volcanic activity (Vesuvius); and in metamorphosed rocks often associated with magnetite.

Concentrations in commercial quantities are formed as replacements of limestone by haematite, probably derived from overlying sediments (Cumberland, Lancashire, Spain, Utah); from the alteration and concentration of iron silicates and carbonate of sedimentary origin (Lake Superior district); as sedimentary beds (Alabama); in metamorphosed rocks (Brazil, Elba); and in residual deposits by weathering (Cuba, eastern U.S.A.). Apart from its use as an iron ore, haematite has more limited applications as a pigment, polishing abrasive, gemstone, in the manufacture of crayons, etc. See *Iron Ores*.

**Haematoxylin**. Colourless crystalline compound present in freshly chipped logwood (*Haematoxylon campechianum*). It is converted into the colouring matter haematein, naturally in the wood, on lengthy exposure to the air, and artificially by the addition of an alkali. Haematoxylin is prepared by combining fresh logwood extract with ether. It is employed in dyeing textiles. Logwood was formerly used in medicine as a mild astringent.

**Haemocoel**. The great cavity in the Arthropoda (*q.v.*) in which is found the fluid serving the func-

tion performed by blood in other creatures. It is probably to be understood as a huge enlargement of the blood-vascular system which, by enlarging, has obliterated the true coelom.

**Haemoglobin** (Gr. *haima*, blood; Lat. *globus*, ball). The colouring matter of the blood and the means by which the gaseous exchange of carbon dioxide and oxygen is carried out. It is readily attacked by certain gases, e.g. carbon monoxide and sulphuretted hydrogen. In the vegetable kingdom it is replaced by chlorophyll, one or other being present in any multicellular organism which respire.

**Haemophilia**. Congenital tendency to bleeding. For its cause, see under *Blood*. It occurs in the male only, while being transmitted by the female of the line. The deficiency in the blood stream can be restored in a test tube by adding some very dilute Russell viper venom, whereupon haemophilic blood clots quite normally. This fact is made use of by local application of Russell viper venom to the wound of a bleeding haemophilic. The poison of this snake kills its victim by coagulating the blood in the vessels.

**Haemoptysis** (Gr. *haima*, blood; *ptysis*, spitting). Bleeding from the larynx, trachea, or lungs. It is bright red and frothy in character. The spitting of blood demands medical aid without delay, as the condition may be associated with serious disease, often tuberculosis.

**Haemorrhage** (Gr. *haimorrhagia*, bloody flux). Internal or external discharge of blood from a blood-vessel. Internal haemorrhage, when the bleeding occurs into the cavity of the chest or abdomen, may be recognized by the onset of faintness, pallor, air-hunger, failing pulse, and collapse. The patient should be laid flat, fresh air should be provided, ice given to suck, and cold dressings, preferably in the form of ice, applied to the seat of the haemorrhage if known. If collapse occurs, the limbs should be raised and bandaged firmly from end to end. No stimulant should be given, as this tends to cause a continuance of the trouble. Bleeding from the lungs, when bright and frothy blood is expectorated, should be treated similarly; and also bleeding from the stomach when blood, dark in colour, and often resembling coffee-grounds, is vomited.

External haemorrhage may be arterial, venous, or capillary. Arterial haemorrhage occurs when an artery, i.e. a blood-vessel

conveying blood from the heart, is injured. It is recognized by the bright red colour of the blood, which, unless the wound is very deep, is seen to escape from the end of the artery nearer the heart in pulsating jets, corresponding in rhythm to the heart-beat. Venous haemorrhage occurs when a vein, i.e. a blood-vessel conveying blood to the heart, is injured. The blood either wells up from the depth of the wound, or is seen to flow from the side of the wound farther away from the heart. It is dark in colour, and escapes in a steady stream. Capillary haemorrhage, i.e. bleeding from the capillaries, which are very fine blood-vessels found in the skin and almost universally throughout the body, occurs in all wounds to a greater or less extent. It is recognized by the steady oozing of bright red blood from all parts of the wound.

In some cases a tourniquet is essential, and this may be extemporised by lightly bandaging a hard pad on the pressure-point, and then twisting the bandage with a stick so as to tighten the bandage. Bleeding from a vein can usually be stopped by pressure upon the wound, but if this fails pressure should be exerted on the side of the wound farthest away from the heart. In bleeding from a varicose vein, pressure should be applied on both sides of the wound. Bleeding from capillaries can always be stopped by pressure upon the wound, or by the application of hot (not warm) or cold water. *See Blood; First Aid; Tourniquet.*

**Haemorrhoids** (Gr. *haima*, blood; *rhein*, to flow) or **PILES**. Varicose veins in the anus and lower part of the rectum. The most frequent causes are a sedentary life, chronic constipation or loose motions, and any disease which retards the circulation through the veins, such as congestion of the liver. Women suffer less than men, but pregnancy and diseases causing enlargement of the uterus sometimes bring on the condition. When the enlarged veins protrude from the anus and are covered with skin, they are known as external piles, those within the anus in the lower rectum being referred to as internal piles.

Treatment consists in rest, simple food, and the maintaining of soft-formed stools. Cure, not always permanent, is by operation or by injection of a sclerosing substance.

**Haemostatic.** Substance used to check bleeding. Some of these substances are given internally,

such as adrenalin, which acts by contracting the oozing vessels, as does ergot in bleeding from the uterus. Calcium has a powerful rôle in the clotting of blood, while serum from a bled horse, applied or injected, supplies missing substances in the human blood stream; but the best haemostatic in obstinate cases of bleeding is a blood transfusion, restoring for the patient the intricate mechanism of coagulation which has become disorganized. Simple haemostatic applications are adrenalin, which shrinks the vessels, and the astringent group represented by tannic acid, alum, etc. Of all local applications, Russell viper venom has perhaps the greatest value. The venom of this snake kills its victim by coagulating the blood in the vessels, so that its use as an applied haemostatic is logical. Troublesome bleeding tends to occur when the vessel walls degenerate with damage done by streptococcal infection, or deficiency of Vitamin C. *See Blood; Haemorrhage.*

**Haff.** German name for the lagoons along the south Baltic coast. They are due to the gradual formation of an alluvial bar, or *Nehrung*, across the mouth of an estuary where the outward silt-laden current of a river is checked by the different direction of the currents farther out to sea. The haff, or lagoon, within the bar, is steadily being silted up since the bar interferes with the free outflow of the river floods. *See Lagoon.*

**Haffkine, WALDEMAR MORDECAI WOLFF** (1860-1930). Russian bacteriologist. Born of Jewish parents at Odessa, he was educated at the university there and engaged in research work at the zoological museum, 1883-88. He was assistant to Pasteur in Paris, 1889-93. Employed by the British government in India, he invented a vaccine which greatly reduced mortality from plague. He was also in the forefront in fighting the cholera scourge by protective inoculation. The research laboratory, now the Haffkine Institute, at Bombay was founded by Haffkine, who died Oct. 26, 1930.

**Haffner Symphony.** Popular title of the symphony no. 35 in D by Mozart. This was originally written as a serenade for the Haffner family of Salzburg. It was later orchestrated in its present form by the composer, being completed at Vienna in 1782.

**Hafid, MULAI** (b. 1873). Sultan of Morocco. Son of Mulai Hassan II, he was educated at Al Azhar university, Cairo, and on his return

to Morocco was appointed viceroy to the southern part of the kingdom. The policy of his half-brother, Abd-el-Aziz, led Mulai Hafid to rebel, and in 1907 he proclaimed himself sultan and drove Abd-el-Aziz from the throne. In 1912 he was deposed by his brother Mulai Yussuf.

**Hafiz** (d. c. 1388). Name used by the Persian poet Shams-ud-din Mohammed. He was born at Shiraz, capital of Fars, where he appears to have spent most of his life. His fame as a poet, philosopher, and student of the Koran was such that a college was specially established for him, where he taught for many years. Hafiz, though his personal life earned the censure of the more austere, was a member of a devotional order of Islam.

His great work was the *Diwan*, a collection of short lyrical poems in the form known as the *ghazal*, in expression sensuous and mellifluous, but inspired by the mystical creed of the Sufi. He is regarded as the most finished of the Persian lyricists, and exercised a lasting influence on the forms of Persian verses in later generations. His tomb, a little N. of Shiraz, is still visited by pilgrims. A prose Eng. trans. of the *Diwan*, by H. W. Clarke, was published in 1891; and *Fifty Poems*, by different translators, ed. A. J. Arberry, appeared in 1947.

**Hafnium.** Chemical element, symbol Hf, atomic number 72, atomic weight 178.6. A metallic element, it was discovered by Coster and de Hevesy in 1922. Hafnium compounds are found in association with zirconium compounds and are separated from the latter by fractional crystallisation of the double fluorides  $K_2ZrF_6$  and  $K_2HfF_6$ , or by fractional precipitation of the phosphates. The metal resembles zirconium; it melts at  $2,220^\circ\text{C}$ , and has a density about 12-13; it is ductile and has been used as a constituent of tungsten filaments. The oxide  $HfO_2$  is a white refractory solid; phosphates of hafnium have been prepared; the chloride  $HfCl_4$  is volatile at  $250^\circ\text{C}$ .

**Hagana** (Hebrew, defence). National army of the state of Israel. Originally formed illegally in 1936-39 to resist the violence of Arabs during the Arab revolt, it supported, and had the support of, the Jewish agency (q.v.). During the Second Great War a large number of the Palestinian Jews who served against the Axis were recruited by the British

from its ranks; but it was still not recognized officially, and the possession of arms by its members remained illegal. Members did useful work in commando operations and military intelligence; the Palmach, so-called striking force of the Hagana, was formed on the initiative of G.H.Q., M.E.F., and trained by British instructors. In 1943, when it became clear that the Jewish community through the Hagana was building up stores of arms in Palestine, measures of disarmament were taken, Jews being imprisoned for illegal possession of arms. When the cleavage between the British and the Jews became acute in 1946, the Hagana was responsible for certain acts of violence in Palestine. With the end of the British mandate and the formation of the independent state of Israel, Hagana came into conflict with Irgun (*q.v.*). Recognized by the Israeli govt. as its regular army, it fought well in the Arab-Jewish war that followed. All men from 18 to 40 were mobilised. See Palestine.

**Hagar.** Egyptian handmaid to Sarai, by whom Abraham became the father of Ishmael (Gen. 16). Sarai's jealousy caused her to flee with her son to the wilderness, where, in a vision, she learnt the future of Ishmael. She returned to Abraham, but at a later date was finally sent away, and afterwards married her son to an Egyptian woman (Gen. 21). See Abraham.

**Hagen.** Town of W. Germany, in North Rhine-Westphalia, 30 m. N.E. of Düsseldorf and just S. of the river Ruhr. It stands at the confluence of the Ennepe and the Volme. In 1929 it absorbed the former town of Haspe to the S.W. It is the centre of Germany's small machinery and tool industries. In the Second Great War it suffered immense damage chiefly from air raids. The town, which stands in pleasant wooded surroundings, is almost entirely modern, though there is a church dating from 1748. Pop. (1955 est.) 175,600.

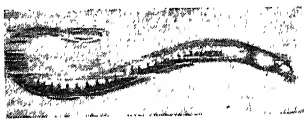
**Hagen, WALTER** (b. 1892). An American golfer. Born at Rochester, N.Y., Dec. 21, 1892, he won the open championship of his country in 1914 and 1919, the championship of France in 1920, and that of Belgium in 1924. He became the only foreigner to win the British open title four times, in 1922-24-28-29, the last victory being remarkable for a round of 67 in a thunderstorm. A member of the original Ryder Cup side of 1919, he was captain of teams visiting England in 1929 and

1933, and non-playing captain in 1937. Once he beat R. T. Jones (*q.v.*) by 12 and 11. Hagen could be erratic in his long game, but redeemed errors by his putting. Consult The W.H. Story, W. Hagen and M. S. Heck, 1957.

**Hagenbeck, CARL** (1844-1913). German dealer in wild animals. Born in Hamburg, June 10, 1844, he succeeded to his father's menagerie, and sent expeditions, *e.g.* to Africa, to catch animals; devised ways for the "training by kindness" of wild animals, succeeding with allegedly untamable Polar bears; and introduced the outdoor zoo without cages. That built by him in 1897 at Stellingen, near Hamburg—severely bombed during the Second Great War—served as prototype for zoos the world over, *e.g.* Whipsnade. Two sons succeeded Hagenbeck on his death, April 14, 1913, and after the interruption of the First Great War became once more the world's leading suppliers of wild animals. See Zoological Gardens.

**Hagerman Pass.** Lofty mountain track over the Rocky Mts. of Colorado, U.S.A. It is on the line of the Colorado Midland rly., and reaches an alt. of 11,535 ft.

**Hag-fish** or **Hac** (*Myxine glutinosa*). Order of marine animals belonging to the lamprey group.



Hag-fish, species of lamprey found on the coasts of Britain

In appearance they resemble small round eels, but have no side fins and no lips. They have teeth on the tongue and palate, and tentacles on the head, which seem to assist them in boring their way into the bodies of the fishes on which they feed. Their eyes are much reduced. They secrete a remarkable amount of thick slime. The common hag-fish is found on the British coasts, and is occasionally 2 ft. long. These animals are not true fish, and are separately classed by zoologists as Cyclostomata, round-mouthed.

**Haggai.** Tenth of the minor prophets of the O.T. He returned from the Babylonian captivity with Zerubbabel, and began to prophesy in his old age. His book in two chapters is homely in style and contains four prophecies, all belonging to the same year, and designed to encourage the people

in rebuilding the temple. It was written, according to his own statement, in the second year of the reign of Darius Hystaspis (520 B.C.).

**Haggard, SIR HENRY RIDER** (1856-1925). British novelist. He was born at Bradenham, Nor-



H. Rider Haggard  
Russell

folk, June 22, 1856, and educated at Ipswich grammar school. He held official posts in S. Africa, 1875-79, and was then called to the bar at Lincoln's Inn. A first work, Cetewayo and His White Neighbours, was published in 1882. South Africa figures prominently in his novels, the success of which is due to Haggard's exceptional narrative and descriptive powers.

In addition to King Solomon's Mines, 1885, his most successful adventure story, and Jess, 1887, perhaps his best work, his novels include Dawn, 1884; She, 1887, in which mystery is blended with adventure; Allan Quatermain, 1887; Colonel Quaritch, V.C., 1888; Cleopatra, 1889; Allan's Wife, 1890; Nada the Lily, 1892; Montezuma's Daughter, 1893; The Heart of the World, 1896; Ayesha, 1905; Fair Margaret, 1907; Red Eve, 1911. In 1891, with Andrew Lang, he wrote The World's Desire.

Haggard, who was knighted in 1912, became prominent as a practical farmer and an agricultural economist. His journeyings through England in 1896-98 to investigate rural conditions resulted in a valuable work, Rural England, 1902. After the First Great War he visited every part of the British Empire in connexion with settlement of ex-servicemen. He died May 14, 1925.

**Haggerston.** Suburb of N.E. London. Mentioned in Domesday as Hergotestane, and once a hamlet in the parish of S. Leonard's, Shoreditch, it is covered with factories and artisan dwellings, and stretches from the N. side of Hackney Road to Dalston, and from Kingsland Road on the W. to London Fields. There were several almshouses founded by city companies. Near Hackney Road is the Queen Elizabeth hospital for children, built 1868. Of the churches, S. Augustine's dates from 1867; S. Columba's from

1868; S. Chad's from 1869. S. Mary's was destroyed by German bombs in 1941. Halley, the astronomer, was born in Haggerston.

**Haggis.** Ancient Scottish dish, supposed to have been adapted from the French. The stomach of a sheep, having been thoroughly washed and allowed to soak for several hours in cold salt water, scalded in boiling water, and then scraped with a knife, is used as a bag into which the ingredients are placed, chiefly the heart, liver, and lungs (pluck) of a sheep.

For a meal intended for eight persons there are added 1 lb. of finely shredded suet, two chopped onions, half a pint of oatmeal or  $\frac{1}{2}$  lb. of toasted and crumbled oatcakes, two teaspoonfuls of salt and one of pepper, half a nutmeg (grated), a grain of cayenne, half a pint of good gravy, and the juice of a small lemon. Having been drained, boiled, and trimmed, half the liver is grated and the rest of the ingredients are finely minced. All the ingredients are then put into the prepared bag—care being taken that no thin parts of the bag are left, and that allowance is made for swelling—carefully sewn up, plunged into boiling water and boiled gently for three hours, being pricked with a needle occasionally during the first half-hour, and then served hot without sauce or gravy. Burns, in his poem, *To a Haggis*, describes the dish as "great chieftain o' the puddin' race."

**Hagi.** Town of Japan, on the island of Honshu. Situated near the S.W. extremity of the island, 50 m. W. of Hiroshima, it is notable as the seat of the daimos of Chosu, who were largely instrumental in crushing feudalism. Pop. 32,270.

**Hagiography** (Gr. *hagios*, holy; *graphein*, to write). General term for sacred writings, or for biographies of saints. Of related words hagiographia, of frequent use in the early Church, was applied by the Jews to the Psalms, Proverbs, Job, Ezra, Esther, Chronicles, Solomon's Song, Ruth, Ecclesiastes, Nehemiah, Lamentations, and Daniel, books not read publicly in the synagogues. Hagiocracy means a priestly hierarchy, hagiolatry the worship or invocation of saints. See Saint.

**Hagiology** (Gr. *hagia*, holy things; *logos*, account). Term applied to literature dealing with the saints of the Christian Church. It includes all the martyrologies and biographies of saints and martyrs. The Roman martyro-

logy contains about 3,000 names. The Eastern lists are also lengthy, and to these must be added the long list of local saints whose memory is preserved only in their native country. Cornwall and Brittany, for example, commemorate early saints of whom hardly anything is known.

The earliest attempt at a hagiology is that of Eusebius, The Assembly of the Ancient Martyrs. In the Greek Church, the hagiologies or menologies date from the 9th century. The first attempt at a criticism and revision of the hagiologies of the Western Church was made by the Flemish Father Rosveyde (d. 1629). His researches led to the compilation of the *Acta Sanctorum* and the establishment of the Bollandists (*q.v.*). See Martyrology; Saint.

**Hagion Oros**, GULF OF. Opening of the Aegean Sea. It lies between the peninsula of the same name and that of Longos, the easternmost and central prongs of the Chalcidic peninsula in Macedonia. It is also called the gulf of Monte Santo, and is about 20 m. in length, and 15 m. in breadth at its widest. The peninsula of Hagion Oros is also named the Athos peninsula, because Mt. Athos stands on it.

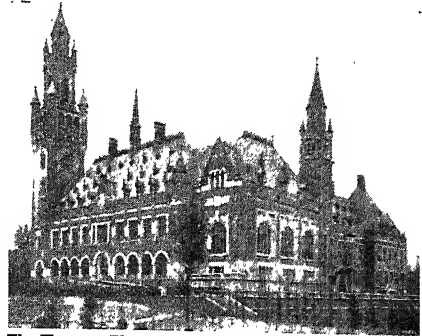
**Hagioscope** (Gr. *hagios*, holy; *skopein*, to look at). Oblique opening in the internal walls of a church, usually running from the transept into the chancel and affording a view of the altar. Its purpose was to enable the congregation in the transept to see the elevation of the Host at mass. The term was figuratively applied to the leper's squint, an opening in the wall of the church whereby lepers could watch the service without coming in contact with the congregation.

**Hague**, THE (Dutch, Den Haag or 's Gravenhage). Seat of the Netherlands government and capital of the prov. of S. Holland. It lies



The Hague arms

in flat country, in parts sandy, but pleasant and well tilled, about 14 m. N.W. of Rotterdam and  $2\frac{1}{2}$  m. from the North Sea at Soheveningen. The city is attractively laid out, with broad streets and pleasant squares, in orderly



The Hague. The Palace of Peace opened in 1913 as a seat for The Hague Tribunal and for peace conferences

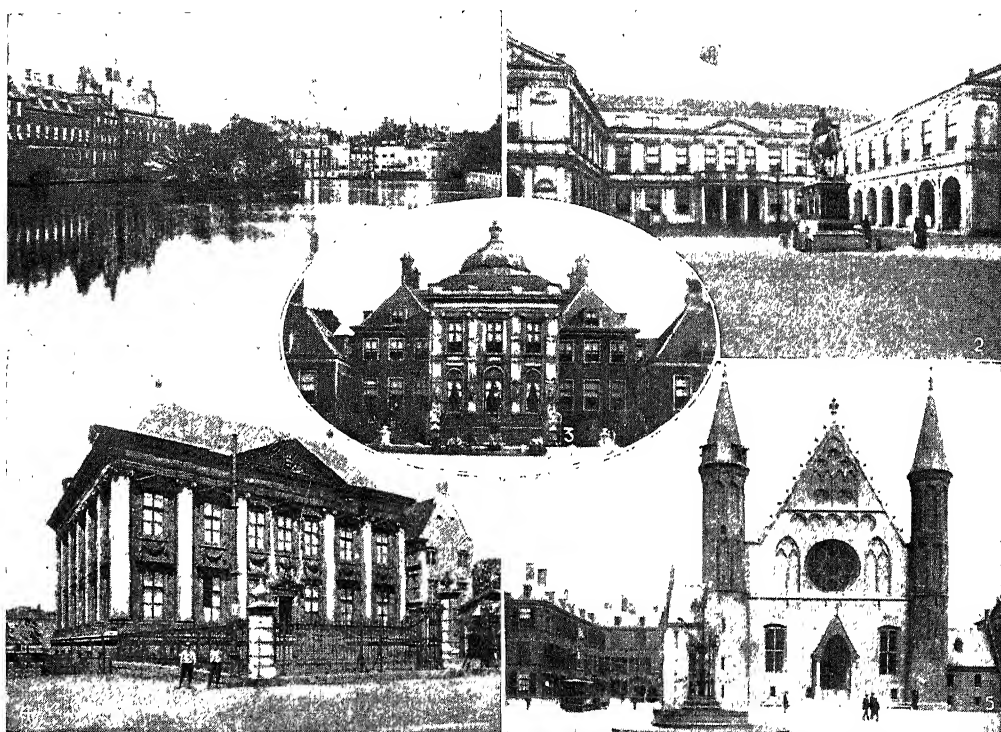
but not monotonous arrangement. There are two large rly. stations and good tramway services. The Hague is the residence of the royal family, and the seat of the legislative and central judicial bodies of the country. Its chief industries are printing works, distilleries, furniture, and earthenware works. Pop. (1955) 596,675.

The central point of the city is the Plein, near which stand the buildings of the supreme court, the ministries of war, justice, and overseas territories, and the Mauritshuis, erected 1633-44 and rebuilt 1704-18, in which is housed the famous collection of pictures made by successive princes of Orange. Close by is the Binnenhof, a group of buildings round a square, where are the Hall of the Knights, used by the chambers in joint session, and the halls in which the first and second chambers sit. The Gevangenpoort, overlooking the ornamental water known as the Vijver, is a medieval tower formerly used as a prison.

The town hall, originally built about 1565 and restored in the 17th century, is a highly characteristic Dutch building of its period. The most notable churches are the Nieuwe Kerk, dating from the mid-17th century, where lie the remains of the de Witts (*q.v.*) and formerly lay those of Spinoza; and the Groote Kerk, a 15th century Gothic building, with a lofty tower and ironwork spire and a carved 16th century pulpit.

The royal palace, an 18th century edifice enlarged 1816-17, stands on the Noordeinde and has extensive private gardens behind. To the N. lies the pleasant open space of the Willems park, the heart of the fashionable quarter of the city, with the large monument erected in 1869 to commemorate the achievement of national independence in 1813.





The Hague. 1. The Vijver, an ornamental water in the centre of the city, with part of the Binnenhof on left. 2. The Palace of the Queen, with statue of William the Silent, by Count Nieuwerkerke, 1845. 3. The Huis ten Bosch, the royal villa in the woods, built 1645. 4. The Mauritshuis, rebuilt 1704-18, containing the famous picture galleries. 5. The Hall of the Knights in the Binnenhof, meeting place of the Dutch chambers

Other places of interest are the Steengracht gallery, the municipal museum, the royal library, the Mesdag museum, and the museum of industrial art.

To the N.E. of the town lie the zoological gardens. The beautiful Haagsche Bosch, a large wooded park, in parts quite wild, contained the royal villa known as the Huis ten Bosch, built about 1645, in which the first international peace conference met in 1899; but the Bosch was laid waste by the Germans in the Second Great War. The palace of peace, built largely at the expense of Andrew Carnegie to the designs of the French architect Cordonnier, to house the international peace conferences and the court of arbitration, was opened in 1913. (See Hague Tribunal.)

In history The Hague has enjoyed the advantages of its isolated position in the Low Countries, and comparative tranquillity. Its origins are traced to a hunting seat of the counts of Holland, c. 1250, which gradually became their regular residence towards 1280. From the last decade of the 16th century The Hague was the political centre of the states

general of Holland, which gave it increased importance. The murder of the de Witts in 1672 was a terrible episode.

In 1795 the French revolutionary armies captured the city, and the Batavian republic was set up. It remained in French possession until 1813. Even as late as 1806 The Hague held the status of a village, but Louis Bonaparte then raised it to a town.

The Hague has long been a centre of diplomacy, and has given its name to several treaties. Among them are the alliance of England, Sweden, and the Netherlands, 1668; and the treaty between England, France, and Holland in 1717. The old-standing tradition of The Hague as a peace-making centre of the nations led many to support its claims to be the seat of the League of Nations, but Geneva was selected.

German parachute troops landed near The Hague on May 10, 1940, during the invasion of Holland, but most were destroyed by Dutch troops. Airborne units landing at various points along the coast advanced on The Hague with the object of seizing Queen Wilhelmina and the government, all of whom,

however, escaped to England. The city was considerably damaged by air raids; and there was fighting in the city between Dutch troops and fifth columnists, before the Germans entered on May 15. A brilliant low-level attack was carried out by R.A.F. Mosquitoes on a house in the Scheveningsch Weg on May 3, 1944; the building, with documents belonging to the Gestapo, was completely destroyed. On March 3, 1945, the R.A.F., attacking V2 sites, unintentionally destroyed instead a residential area. The Hague was occupied by the Germans until May 8, 1945.

**Hague, CAP DE LA.** Promontory of the Cotentin peninsula, France, in the dept. of Manche. It is at the N.W. extremity of the dept. and juts out into the English Channel, 12 m. N.W. of Cherbourg. Alderney is 10 m. W. of the point, and about 35 m. E.S.E. is the roadstead of La Hogue or La Hougue.

**Hague Agreements.** Agreements signed on May 28, 1937, for the fostering of mutual trade between the "Oslo states"—Belgium, Denmark, Finland, Luxembourg, the Netherlands, Norway, and Sweden, the signatories to the

Oslo protocol of Dec. 22, 1930. The duration of the Hague agreements was to be one year. They were not renewed, owing to the unfavourable development of the world trade cycle, although the signatories placed on record their desire to continue economic collaboration.

**Hague Conference.** An international conference held at The Hague in the interests of peace. The suggestion for a conference of this kind came from Tsar Nicholas II, and in 1899 there met representatives from European countries and the U.S.A. The members signed three conventions. The first concerned the establishment of an international court of arbitration, long known as The Hague tribunal; the second dealt with the laws and customs of war; and the third with naval warfare. In addition it was declared that throwing missiles from balloons, and the use of poison gases and of expanding bullets, were illegal.

A second conference met in 1907, when a proposal put forward by the British government for the reduction of armaments was rejected; but in other directions much was done. The conventions of 1899 were revised, and conclusions were reached on such matters as the rights and duties of neutral states in naval warfare, the conversion of merchant vessels into warships, the laying of automatic submarine contact mines, the bombardment of undefended towns by warships, etc. A resolution was passed on the strength of which a conference on prize law met in London in 1908 and drew up the Declaration of London. Conferences of many European powers were held at The Hague in 1893, 1894, 1900, and 1904 to deal with matters of private international law—for instance, marriage. See Hague Tribunal; International Law; United Nations.

**Haguenau.** Town of France, in Bas-Rhin dept. (Alsace). It stands on the Moder, 18 m. N. of Strasbourg. It was fortified by Barbarossa in the 12th century, and the palace which he built there remained until destroyed by the French in 1678. The centre of a hop-growing dist., the town engages in wool-spinning and makes porcelain stoves. It became a free imperial city in 1257. The principal church, that of S. George, dated from the 12th century, and contained a great wooden figure of Christ (1488). Haguenau passed to France by the treaty of Westphalia (1648), became German in

1871, and once more was transferred to France in 1919. It suffered severely in the three weeks' heavy fighting which preceded its liberation, Dec. 11, 1944, in the Second Great War. Pop. (1956) 19,531.

**Hague Tribunal.** International court of arbitration established in 1899 for the settlement of disputes between one country and another. Its home was at The Hague, in the Palace of Peace, opened 1913. It arose out of the peace conference held there in 1899, when it was decided to form a permanent international court of arbitration. Up to the Second Great War a number of cases were referred to the tribunal, among them being that of Great Britain, Germany, and Italy against Venezuela. The permanent court of arbitration was merged into the scheme of the International Court of Justice (with headquarters at The Hague), set up by the United Nations. This met for the first time in Feb., 1946. See International Court of Justice.

**Haha** (O.E. *haw*, hedge). Sunk-fence or ditch. Fences are erected in this manner in order not to spoil the view. Usually they take the form of an ornamental sunken hedge concealing a fence.

**Hahn, Otto** (b. 1879). German chemist and physicist. Born at Frankfurt-on-Main, March 8, 1879, during the early years of the century he was engaged in working out the thorium and actinium series of radio-active elements. As director from 1924 of the Kaiser Wilhelm Institute of chemistry at Berlin, Hahn played an outstanding part in atomic research. He gave up his work in Germany during the final phase of the Hitler regime, and went to the U.S.A., returning after the Second Great War to a professorship at Göttingen, W. Germany. He was awarded the Nobel chemistry prize in 1944.

**Hahnemann, Samuel Christian Friedrich** (1755–1843). German physician. Born at Meissen,



Samuel Hahnemann, German physician

April 10, 1755, he became a doctor after studying at Leipzig and Vienna. He practised in Dresden and Leipzig, but his reputation rests upon the system of homeopathy which he founded. His theory was first put forward in an article in 1796 and was afterwards worked out more deliberately in books, especially his chief one, The

Organism of Rational Health. He practised at Köthen and later in Paris, after he left Leipzig owing to the unpopularity of his theories among those whose business was affected thereby, but he had the satisfaction of seeing them widely accepted. He died July 2, 1843. See Homeopathy; consult also Life and Letters, T. L. Bradford, 1895; Life, R. Haehl, 2 vols., Eng. trans., 1927.

**Hai-cheng.** A town of Manchuria, in China. It stands on the S. Manchurian rly., and is a centre of the Manchurian silk trade. Pop. 681,500.

**Haida** (men). North American Indian tribe in Queen Charlotte Islands, British Columbia, and Prince of Wales Island, Alaska. Their culture, characterised especially by skilful wood carving, is amongst the most highly developed to be found in the N.W. Indian peoples. From a population of more than 8,000 in 1841, they had been reduced to 767 by 1951.

**Haider Ali** or **HYDER ALI** (c. 1722–82). Ruler of Mysore. A Mahomedan of insignificant parentage, he entered in 1749 the service of the raja of Mysore, where his strong personality soon placed him at the head of affairs. In 1763 he conquered Kanara, and the wealth thus attained completely turned his head. In alliance with the nizam of Madras he fought the British at Chengam, 1767, and was signally defeated. Persisting in hostilities, he succeeded in 1769 in effecting a treaty with his victors, but was unable to induce them to help him in his campaign against the Marattas in 1772. In revenge for this he took advantage of the war with France to march on Madras, 1779, but after some initial successes was routed by Sir Eyre Coote in an engagement near Porto Novo. He died at Chittoor.

**Haiduk.** Hungarian word given to a certain class of outlaws in Turkey and other Balkan countries, e.g. Serbia. It meant originally robber, but in Hungary it came to refer to mercenary soldiers. Early in the 17th century these received a grant of land on the left bank of the Theiss, which was then called the Haiduk district. It was also used for the retainers of the Hungarian landowners. One theory is that the word was first given to some Turkish outlaws who took refuge in Hungary.

**Haifa.** Town and principal port of Israel. Lying in the bay of Acre, under Mt. Carmel, it has a roadstead free from reefs, and is

the only good harbour in Palestine, with a depth of 30 ft. alongside the main quay. It is the terminus of the 620-mile pipe-line from the Iraq oilfields, and has extensive refineries. Haifa lay within the state of Israel, proclaimed 1948. Subsequent Arab-Jewish tension led to the suspension of the transmission of oil from Iraq, and the refineries were out of action until small quantities of petroleum were brought in from the western hemisphere during 1950. Pop. 190,000.

A standard gauge rly. runs N. from Haifa into Syria, and S. to Egypt. A narrow gauge rly. runs to Nablus, and there is a branch line via Deraa in Syria to Amman and Ma'an in Jordan. Good motor roads lead to the principal towns of Israel, and Haifa is the terminus of the road route to Bagdad. There is an airport. The town is handsome and spacious.

During the First Great War Haifa was occupied by advancing British troops on September 23, 1918. During the Second Great War, it was one of the two contraband control bases for the Mediterranean area and an important refuelling base for Allied warships. It was frequently raided by Axis aircraft during 1940-42. Haifa was the scene of many acts of terrorism during the Arab and Jewish conflicts with the British administration. It was a trans-shipment port for illegal Jewish immigrants apprehended by the Royal Navy during 1945-48.

**Haig, DOUGLAS HAIG, 1ST EARL, 29TH LAIRD OF BEMERSYDE (1861-1928).** British soldier, c.-in.-c. of the British forces in France for the greater part of the First Great War. Born in Edinburgh,

June 19, 1861, youngest son of an ancient Fife family, he was educated at Clifton and Brasenose College, Oxford, whence he went to Sandhurst, and was gazetted in 1885 to the 7th Hussars. After passing through the Staff College, he served in the Khartum campaign of 1898. During the S. African war he acted as chief of staff to Sir J. French at Colesberg in 1900, and in 1901-02 commanded a group of columns under Kitchener. From 1903 to 1906 and again from 1909 to 1912 he served in India, becoming chief of staff to the Indian army. Returning to Europe he was appointed to the Aldershot command.

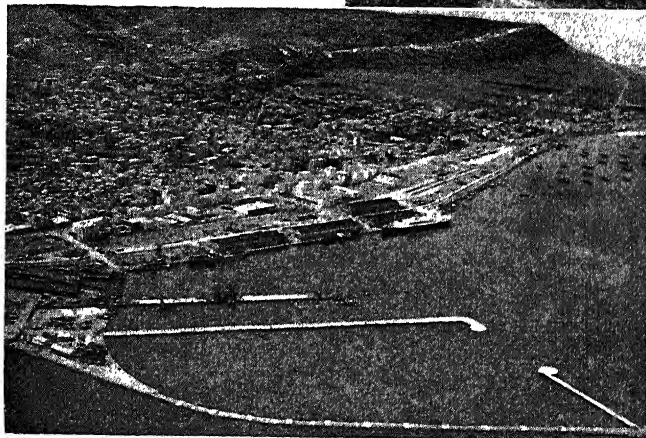
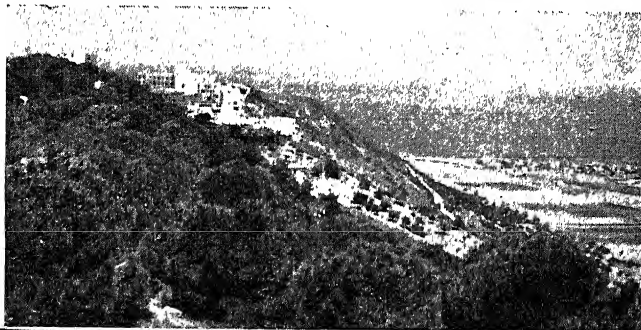
At the outbreak of the First Great War in Aug., 1914, he went to France in command of the 1st corps, and took part in all the earlier battles, becoming in Jan., 1915, commander of the 1st army. In Dec., 1915, he succeeded French



*Haig. J.H.*

as c.-in.-c., and held the position until the end of the war, being promoted field-marshal Jan. 1, 1917. In the Somme offensive of 1916 his thoroughness of organization was seen in the completeness of preparations for the attack, which involved very great engineering work. In 1917 he was required to act under Nivelle's direction, but he gained two brilliant victories

at Arras and Messines, though his arrangements were upset by the necessity for prolonging the Arras attack in order to relieve the pressure on Nivelle, whose offensive on the Aisne had failed. Thus the 3rd battle of Ypres did not open until July 31, when the good weather had gone. This involved fearful sacrifices without giving complete victory. The 1st battle of Cambrai was a remarkable success, but again it could not be exploited. In the early part of 1918 Haig's reserves were greatly weakened,



Haifa. The harbour, opened in 1833. Top, Mount Carmel from the east, showing the monastery, parent-house of the Carmelite order, founded here in the 12th century; outskirts of Haifa are seen on the right

and when the great German offensive was opened on March 21, disastrous initial loss was inflicted by the rapidity and overwhelming weight of the advance; but the British dispositions were generally justified and the attack was not fatal. On the other hand, when Haig took the offensive on Aug. 8, he handled his troops with great skill, pressed the Germans firmly and relentlessly, and won a series of victories against forces not inferior in strength such as no general had previously gained in the war. The greatest feat in his career was his assault on the Hindenburg line (Sept. 27-Oct. 1), undertaken against the judgement of the British war cabinet, and Foch.

Haig's leadership has been the subject of much criticism. It is

said that through lack of imagination and his habitual caution he lost opportunities, and that his stonewall tactics in the war of attrition too often led to disaster. But he led, in the most terrible war in history up to that time, by far the largest British forces which had ever taken the field; and by sheer strength of character and determination he played the leading part in the 100 days of almost continuous battle which ended the war. His armies seldom saw him in person, never heard his voice, for he was shy of public appearances; yet they trusted him, and responded magnificently to the implicit appeal of his famous "backs to the wall" order of April 11, 1918.

In 1919, Haig was awarded an earldom, and received the O.M. and a grant of £100,000. His remaining years were devoted to improving the lot of the men who had served under him, uniting the various efforts on their behalf into the British Legion, of which he became president. Almost alone among the military and other leading figures of the war, he retained a dignified silence amid the various controversies which followed the war, and made no attempt to justify or apologise for his war record. He died suddenly in London, Jan. 29, 1928, and was buried in Dryburgh Abbey, ancient burial place of the family. An equestrian statue was unveiled in London, 1937 (*see* Hardiman *illus.*). His only son George Alexander Eugene Douglas Haig (b. 1918) succeeded to the title.

**Bibliography.** *Cavalry Studies*, D. Haig, 1907; *Despatches*, ed. J. H. Boraston, 1919; *The Private Papers of Douglas Haig*, ed. R. Blake, 1952; *Sir D. H.'s Command*, G. A. R. Dewar and J. H. Boraston, 1929; *Lives*: E. Protheroe, 1928, J. Charteris, 1929, Duff Cooper, 1935; *The Man I Knew*, Countess Haig, 1938. *Consult also* War Memories, D. Lloyd George, 1933-34.

**Hail.** Pellets of ice which fall from thunder clouds (cumulonimbus) or large cumulus clouds. They are of various sizes and shapes, complex in structure, and transparent. Hailstones as big as grapefruit and weighing over 2 lb. have been observed. They result from the growth of ice crystals at the expense of water drops lower in the same cloud. These crystals, condensed directly out of the rising air in the higher regions, increase to pellets sufficiently heavy to overcome the resistance of rising air currents. They fall through the

cloud; strike supercooled water drops supported by the ascending air; and freezing occurs, the water uniting with the ice. When the air can no longer support the hailstone it falls to the ground as a mass of ice. Hail does great damage to fruit trees and glass.

**Hail.** Town of Saudi Arabia, in the prov. of Nejd. It lies on the N. slopes of the Jebel Shammar, 240 m. N.E. of the holy city of Medina, and was the capital of the Ibn Rashid dynasty before the advent to power of Ibn Saud, who captured it in 1920. Hail is a station on the motor route opened in 1935 for the convenience of pilgrims between Medina and Iraq. Pop. about 15,000.

**Hailes, DAVID DALRYMPLE, LORD (1726-92).** Scottish lawyer and historian. Born in Edinburgh, Oct. 28, 1726, he was the eldest son of Sir James Dalrymple and a descendant of Viscount Stair. Educated at Eton and Utrecht, he had a successful career as an advocate and



Lord Hailes,  
Scottish lawyer  
After Seton

was made a judge in 1766 as Lord Hailes. He died Nov. 29, 1792. His baronetcy passed to his nephew, and his estates to the family of Ferguson, into which his daughter married. Lord Hailes was friendly with Johnson, Burke, and Horace Walpole. He replied to Gibbon's strictures on Christianity and wrote on antiquarian subjects. His *Annals of Scotland*, a chronological outline, 1057-1371, is scrupulously fair and accurate. HAILES is a village in East Lothian; it stands on the Tyne, and has a ruined castle.

**Haile Selassie I** (b. 1891). Emperor of Ethiopia (Abyssinia), his national title being Negus Negesti Lion of the tribe of Judah, Elect of God. Born at Harar, July 23, 1891, he was the son of Ras Makonnen, descendant of a king of Shoa. Named Lij Tafari, he was made governor of Harar prov. at the age of 14, and in 1916, his aunt Zauditu being empress, heir to the throne and

regent. He virtually held supreme authority long before he was crowned emperor on Nov. 2, 1930. He had promulgated a law in 1924 for the gradual abolition of slavery, all future children of slaves to be free. He now granted a constitution, July 16, 1931, with a parliament of two chambers, and encouraged reforms in law and education.

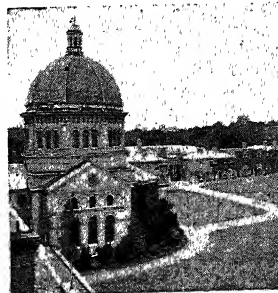


Haile Selassie I,  
Emperor of Ethiopia

When fascist Italy invaded Abyssinia in Oct., 1935, Haile Selassie made a brave and dignified stand, but after the defeat of May, 1936, took refuge in Great Britain and tried to mobilise the moral force of the world against the aggressor, e.g. by a personal appeal to the League of Nations. He succeeded only after Mussolini's attack on France in 1940. Flying to Khartoum, he re-entered his country, Jan. 20, 1941, and his capital, Addis Ababa, May 5. He started at once far-reaching reforms; a decree of Aug. 26, 1942, abolished slavery and serfdom completely. Haile Selassie lost three sons during the war with Italy and the partisan struggle. A daughter died while nursing in Addis Ababa. Three sons and one daughter survived, Prince Asfa Wossen (b. 1916) being crown prince and heir apparent. Haile Selassie was granted representation at the Paris conference in 1946, presenting a claim against Italy for the recovery of Eritrea.

**Haileybury and Imperial Service College.** English public school. Haileybury College was founded in 1862 and took over the college near Hertford maintained by the East India Company from 1806 until its dissolution. It is a Church of England school and is

governed by a council. C. R. Attlee was educated here. The Imperial Service College, Windsor, was founded in 1912. The amalgamation of the two schools took place in 1942 under a supplemental charter. It aims at maintaining the connexions and traditions of both schools.



Haileybury College, famous public school founded in 1862

**Hailsham.** Market town and parish of Sussex, England. It is  $7\frac{1}{2}$  m. N. of Eastbourne, and has a rly. station. The chief building is S. Mary's church, in Perpendicular style. The town has a trade in agricultural produce, cattle and sheep markets, and a few manufactures. Near is Michelham, a residence which was once a monastic house. Market day, Wed. (alternate). Pop. (1951) par. 4,788.

**Hailsham.** DOUGLAS MCGAREL Hogg, 1st Viscount (1872-1950). British lawyer and politician.



1st Viscount  
Hailsham,  
British lawyer

Born Feb. 23, 1872, he was the eldest son of Quintin Hogg (*q.v.*). A n Etonian, called to the bar in 1902, he became one of the leading counsel of his day, and was made K.C. in 1917. He became Conservative M.P. for St. Marylebone in 1922, in which year he was made attorney-general and was knighted. He was appointed lord chancellor in 1928 and created a baron, being made a viscount on his retirement in 1929. He became secretary of state for war in 1931, and leader of the house of lords; and went as British delegate to the Ottawa conference, 1932, and the world economic conference, 1933. Hailsham was lord chancellor again from 1935 to March, 1938, then lord president May-Nov. He died Aug. 16, 1950.

His son Quintin McGarel Hogg, 2nd Viscount Hailsham (b. 1907), educated at Eton and Christ Church, Oxford, became a barrister 1932 and took silk 1953. He was Conservative M.P. for Oxford city from 1938 until, on his father's death in 1950, he moved, much against his will, to the upper house. During the Second Great War he served in the Western Desert and elsewhere. First lord of the Admiralty, 1956, minister of Education Jan.-Sept., 1957, in Sept., 1957, he was appointed chairman of the Conservative party, and at the same time was made lord president of the council.

**Hainan.** Island of China, off the coast of Kwangtung. The capital is Kiungchowfu, the chief port Hoihow. The centre of the island, which is mountainous with peaks rising to 7,000 ft., is inhabited by aboriginal tribes called Sai or Li; elsewhere the people are Chinese. Rubber and tin are produced. Hainan was in Japanese

occupation 1939-45, and in 1950 was seized by the Communist govt. of China. Area 13,900 sq. m. Pop. (est.) 1,750,000.

**Hainault** or **HAINAUT.** Prov. of Belgium, formerly the county of Hainault. It is bounded by the irregular line of the French frontier, and by the provinces of W. and E. Flanders, Brabant, and Namur. The prov. is hilly in parts, especially round Renaix, and in the district called the Borinage, round Mons. The Scheldt, Sambre, Dendre, and Haine are the chief rivers. The seat of the provincial administration is Mons, and other important towns are Charleroi, Tournai, Thuin, Lessines, Ath, Leuze, Enghien, Jumet, La Louvière, Soignies, and Jemappes.

Hainault contains one of the chief industrial areas of Belgium, the rich coal and steel districts centring on Mons and Charleroi. In the N. it is mainly agricultural, cereals and beetroot being important crops; quarries and glassworks are also notable. There are numerous lines in all directions, and the artificial waterways, the Mons-Condé canal and the canalised Sambre with its water connexion to Brussels from Charleroi, are the main outlets to France. The prov. is intimately connected with the coalfields and industries of N.E. France. The inhabitants are almost entirely French-speaking Walloons. Area, 1,436 sq. m. Pop. est. 1,237,000.

As an independent county, Hainault was early important. The first of the long line of counts of Hainault was Reginar I (d. 916), who took part in the acquisition of Lorraine by Charles III of France. His descendant, the countess Rachilda, married Baldwin VI of Flanders, c. 1040, which brought Hainault into close relationship with its northern neighbour. At the end of the 13th century Count Jean d'Avesnes (1279-1304) inherited also the county of Holland, which was united with that of Hainault, until the latter fell to Burgundy, after which its history is knit with that of the Netherlands. Hainault was occupied by the French revolutionary armies in 1794; was included in the kingdom of the Netherlands, 1815; rebelled against King William I in 1830; and was part of the kingdom of Belgium recognized in 1839.

**Hainault Forest.** Open space in Essex, England. Lying to the S.E. of Epping Forest (*q.v.*), it formed part of the ancient Forest of Waltham, of which all 4,000 acres remaining, except Crabtree Wood,

near Chigwell Row, were disafforested in 1851-52. The name Hainault Forest is applied to 805 acres (551 arable land and 254 acres forest) acquired for the public in 1903 at a cost of £23,000; a further £5,000 was expended on works. The area was opened 1906. A further 303 acres were acquired in 1934 (£9,000); 150 acres is used as agricultural land. It is the largest open space under the control of the L.C.C. Fairlop Fair, held in July, 1725-1852, took place about 1 m. E. of Chigwell Row near the famous Fairlop Oak, destroyed by a gale, 1820. From this tree were made the pulpit and reading desk in S. Pancras church, Euston Rd., London.

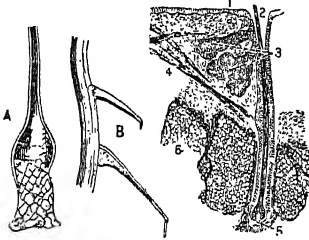
**Hainburg** or **WEISSES LAMM.** Town of Austria. On the right bank of the Danube, 27 m. E.S.E. of Vienna, near the Hungarian frontier, it is a picturesque place surrounded by old walls. On the top of the Schlossberg (950 ft.) are remains of a castle mentioned in the Nibelungenlied. On the Wiener Tor is a statue traditionally said to represent Attila.

**Hainisch,** MICHAEL (1858-1940). First president of the Austrian republic. Born at Aue, Lower Austria, Aug. 15, 1858, he was a lawyer, from 1881 to 1890 a higher civil servant, then a farmer in Styria. He also wrote on agrarian and social problems. From 1898 he was an adviser to the ministry of commerce. On Dec. 9, 1920, after the constitution of the republic had been settled, Hainisch was elected president for four years, and was chosen again in 1924. When obliged to resign after two terms, he accepted the portfolio of agriculture, serving under Schober in 1929-30. A personality of great distinction and of a scholarly mind, Hainisch exercised a moderating influence upon the bitterly opposed, numerically equal forces of Right and Left. The annexation of his country by Hitler was a blow to the previously pro-German Austrian patriot, who died March 1, 1940.

**Haiphong** or **HAI-FONG.** Seaport of Vietnam, in N. Vietnam (Tongking). It stands on the right bank of the Kua-Kam, a tributary of the Song-ka, 60 m. E.S.E. of Hanoi, its port. The modern residential quarter is well laid out, with broad streets and boulevards. Cotton milling is one of the leading occupations. Haiphong was until 1940 a French naval station, having rly. communication with Hanoi and Yunnanfu, and a brisk trade with Hong Kong. There was

fighting here in Nov., 1946, between French parachute troops and Vietnam forces.

**Hair.** Outgrowth or development of the skin characteristic of all mammals. It includes not only



**Hair.** Left, of stinging nettle; A large hair; B smaller hairs with broken tips, growing from veins. Right, human hair: 1, epidermis; 2, mouth of hair follicle; 3, sebaceous follicle; 4, arrector pili muscle; 5, papilla of hair; 6, adipose tissue

fur and hair like that of the human body, but also the bristles of the pig, the vibrissae or whiskers of the cat, and the spines of the hedgehog and porcupine. Its object is to keep the body warm, mammals like the whales, which have little hair, being provided with a thick layer of fat beneath the skin.

Each hair is developed in a little follicle or pit in the skin, and grows from a papilla or small bulb at the base of the follicle. When the hair falls off, or is pulled out, another is developed from the papilla. Permanent baldness is due to the atrophy or destruction of these papillae. The body of the hair is covered with minute scales, and forms a kind of tube containing pigment or colouring matter. The white or grey hair of old age is due to the failure of pigment.

Each hair follicle is provided with sebaceous glands, which secrete an oily liquid for the purpose of lubricating the hair. It has also a tiny muscle by which the hair can be erected. This is efficient in such animals as the common cat, but in the human species it acts but feebly, the phenomenon of the hair "standing on end" being rare. The curious sensation known as "goose skin" is due to the contraction of these small muscles. The hair is constantly being shed and regrown, and it is believed that the entire hair of the human head is renewed every 3-4 years. Baldness may be due to actual disease, want of tone in the skin, or hereditary tendency. In men it is reckoned as a secondary sexual manifestation. Bald patches often accompany nervous exhaustion. Local stimulation may or may not result in the fresh growth of hair.

Unwanted hair in women is a cause of much unnecessary misery. It should be persistently removed either by plucking or by a depilatory. Contrary to popular belief, this does not conduce to further growth. Where the growth of such hair is strong, a glandular imbalance may be present and the need for removal of an adrenal gland indicated.

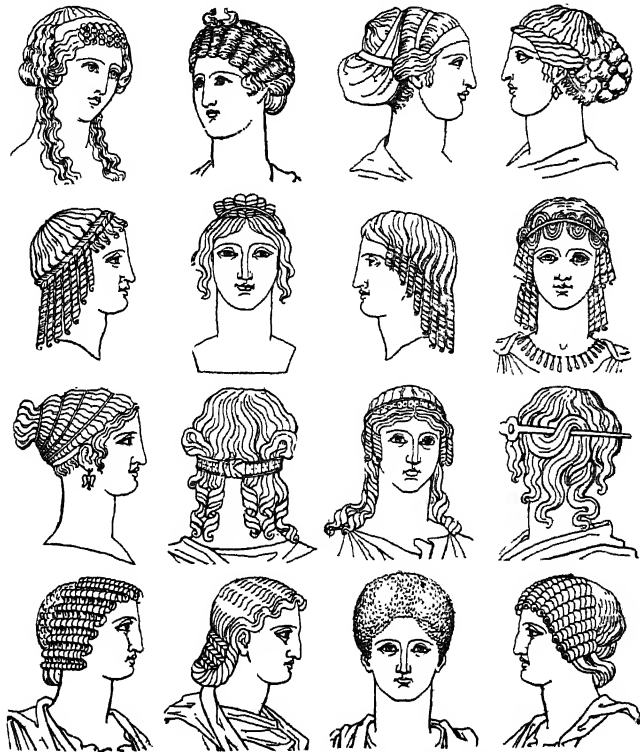
Most mammalia are entirely covered with hair. This is true of the human species, the only absolutely hairless regions being the palms of the hands and the soles of the feet. In some forms hair is a secondary sexual characteristic—the beard of man, the mane of lion and male baboon. Colour of the hair in many animals serves a protective purpose in making the creature resemble its surroundings; this is well seen in the arctic fox, mountain hare, and ermine, which turn white in winter to match the snow, and in the stripes and spots in many animals.

Differences of quality in the hair are characteristic of local varieties of the human species. The hair of Negroes is crisp or woolly; of

Mongolians coarse and lank; of the Australian aborigines curiously crinkled; of the Caucasian races usually glossy and wavy. Speaking broadly, the Latin races have black hair, while the Teutonic races tend to be fair.

**Hairstressing.** The arranging and ornamenting of the hair. Human hair has been the object of such special attention in all ages and among all nations, savage and civilized. Among savages have been found the styles of frizzing so that the hair stands out from the head in a great ball; of gathering into lumps or horns on the top and at the sides with grease; of plaiting into hundreds of cords as is done in the New Hebrides; and of wearing it lank and adorned with a circlet of coloured feathers as among the American Indians. Flowers, bones, shells, kernels, beads, and quills are also used as ornaments.

The Chinese have gradually abandoned their former custom of shaving the head except on the crown, from which hung a long pigtail, in favour of short hair. Some Muslims still shave



**Hairstressing.** Classic styles for women, from which subsequent fashions have developed. Top two rows, Greek; 3rd row, first head Greek, remainder Etruscan; 4th row, Roman

*From Costumes of the Ancients, Thomas Howe*



their heads excepting for a tuft on top which, as a handle, is to help them into paradise after death. Japanese ladies make their hair very satiny and draw it over cushions to a knot at the back. Ancient Britons and Saxons wore long hair, and Saxon ladies twisted their locks and curled them with irons.

The Normans introduced into England the short cut for men, but since that time hair fashions for both sexes have swung between one extreme and another in the Western world. Sometimes they have led both men and women to cover their own hair with enormous wigs—as in the late 17th and the 18th centuries; sometimes the hair has been excessively dressed with pomatums as in the early 19th century. The flowing locks of the early Victorians contrast with the close crop of the typical Prussian officer.

False hair and dyes of various colours have been in use through the ages, sometimes as a concession to fashion, sometimes for individual decorative effect, and very frequently to preserve the appearance of youth. Roman ladies scattered gold dust on their heads; Mary Queen of Scots ordered false additions to her hair while in prison; Pepys' wife adopted flaxen hair.

#### Modern Modes of Hairdressing

The feminine fashion of "bobbed" hair in its various forms, dating from the period of the First Great War, was something of a revolution in style, and led to a remarkable increase in the number of professional hairdressing establishments. Modern applied science came to the aid of hairdressing with the introduction of the so-called "permanent wave," which replaced the earlier use of artificial curls. From plain bobbing, the more severe "shingle" and "bingle" were evolved—hair cut in the nape of the neck like a man's, but left longer at the sides. This trend reached the extreme with the "Eton crop" or boyish cut.

From this stage hair was gradually worn longer again, although few women allowed their hair to grow to its full natural length. Permanent waving then became steadily more popular; but waving with irons remained the most extensively used method of waving and curling until the mid-1930s when hairdressers began to introduce "stand-up" curls and fan-shaped effects with the

hair swept to the top of the head. At the same time the "page-boy" style—longish hair brought straight down and curled under low in the neck—and variations of loose tresses falling to the shoulders and curled under also became popular. Water colour tints which could be washed out were introduced, mainly for evening wear—pinks, blues, and even variegated coiffures being worn.

The successful hairdresser of today must have far more technical knowledge and training than his predecessor. Before the First Great War, his business comprised cutting, washing, dyeing, brushing, and crimping hair only. Today his work involves the use of electrical machinery—hair drying apparatus, permanent waving machines, high frequency and vibro machines—and at least a basic knowledge of chemicals, as they are used in dye processes, permanent wave reagents, setting lotions, etc., which many master hairdressers make up for themselves. See Barber.

#### Hair Grass

(*Deschampsia caespitosa*). Perennial grass of the family Graminae. Widely distributed in temperate and cold climates, it has flat, rough, tough leaves, and shining brown or purplish flower spikelets. Its stems attain a height of 4 ft. or 5 ft., and the plant forms thick tussocks in wet places. The herbage is too coarse for agricultural or grazing purposes.

**Hair Moss** (*Polytrichum commune*). Large moss of the family Bryaceae. A native of all temperate regions, it has awl-shaped leaves with toothed edges, set



Hair Moss. Stems and spore-capsules rising from the foliage

closely around the stiff, pliant stem, which ends in the so-called flower (sexual organs), or in the long-stalked spore-capsule (sporangium) covered by its thatch-like cap (calyptra). The dried plants are used for stuffing pillows, and for making dusting brushes.

**Hair Trigger.** Delicately adjusted rifle trigger which releases the hair, a spring mechanism on the tumbler catch or sear. Only the slightest pressure is necessary to release a hair trigger, which is sometimes fitted in addition to the normal one on firearms.

**Hairy Tongue.** Condition in which the papillae at the back of the tongue become prolonged and hairlike. The cause is unknown. See Blacktongue.

**Haiti OR HAYTI.** Island of the W. Indies, also called Santo Domingo and Hispaniola. It is one of the Greater Antilles. The Mona



Haiti. Map of the West Indian island containing the republic of Haiti and the Dominican Republic

Passage separates it from Puerto Rico on the E. and the Windward Passage from Cuba on the W. The Atlantic washes its N. shores and the Caribbean Sea its S. Haiti is 400 m. long and from 60 m. to 160 m. broad; its area is 29,842 sq. m., nearly the size of Ireland. It is politically divided into the republic of Haiti on the W. and the Dominican Republic on the E.

Haiti is extremely fertile, lofty, and heavily forested, mountain ranges alternating with rich valleys, watered by numerous rivers, and diversified by plains and extensive lakes. Several mountain ranges traverse the island longitudinally, the loftiest peak being Loma Tina in the N.W. (alt. 10,300 ft.). Between the mountains of the N.W. is a broad, fertile tableland called the Vega Real or royal garden, intersected by large streams. The principal rivers are the Artibonite, rising in the mountains of the N.W. and discharging into the Bay of Gonaïves; the Yuna, flowing E.; the Yaqui del Norte, flowing N.W.; and the Yaqui del Sur, flowing S. The largest lakes

lie in the S. and S.W. portions of the island. In the E. is a series of *llanos* or *praderas*, valleys or plains.

The climate is hot and humid, especially on the plains, and is unsuited to Europeans. The rainy season begins in May and lasts generally until the end of Oct., sometimes well into Nov.; the pleasantest months are April to June. Occasionally hurricanes occur during the wet season.

The chief products are coffee, cocoa, cotton, tobacco, hides and skins, gum, honey, sugar, molasses, bananas, rum, sisal, logwood. Cattle-breeding is encouraged. In the dense forests of the mountainous regions valuable woods are obtained, notably mahogany, lignum-vitae, and dye woods. The minerals include gold, silver, copper, tin, iron, nickel, antimony, sulphur, gypsum, kaolin, porphyry, and limestone.

Haiti was first touched by Europeans on Dec. 6, 1492, when Columbus landed on its shores. He named it Hispaniola, and four years later colonists from Spain founded the city of Santo Domingo. A succession of sanguinary conflicts led to the extermination of the aborigines, and within a generation scarcely any survived. Thousands of negro slaves were shipped from Africa to take their place. In the 17th century French buccaneers, who had made the island of Tortuga their haunt, settled on the shores of the Bay of Gonaïves, and in 1697, at the peace of Ryswick, the W. portion, amounting to nearly one-third of the island, was ceded to them. In 1791 the negroes, who had largely increased in numbers, revolted and overthrew their cruel taskmasters, the result being that two years later the emancipation of negroes was decreed by the French convention.

#### Independence Declared, 1804

Under Toussaint l'Ouverture (*q.v.*), who had been made military chief, the negroes captured the remaining Spanish portion of the island, and expelled the Europeans. In 1801 an expedition was sent by France to recover her lost possession, but although they captured l'Ouverture and deported him, they could not maintain their position, and relinquished the island in 1803. The independence of Haiti was proclaimed on Jan. 1, 1804, and during 1804-06 Dessalines ruled as emperor. In 1809-21 the Spaniards recovered possession of the E. end of the island, but the negroes again revolted, and the E.

and W. portions were joined together as the republic of Haiti until 1844, when the Dominican Republic was established. Since that time the history of Haiti, with its two little republics, has been marked by political confusion and a succession of revolutions among negroes and half-breeds. *See* Christophe; Dessalines; Dominican Republic.

**Haiti.** Republic embracing the W. portion of the island of Haiti, in the W. Indies. Area 10,714 sq. m. Though it is smaller in area, it is more important than the Dominican Republic on the E. The coastline is greatly indented



**Haiti, arms of the republic** on the W. by the Bay of Gonaïves, lying between two mountainous peninsulas, and at the head of the bay lies Port au Prince, the capital. Several islands lying off the coast are subject to this republic—the chief being La Gonave, facing the capital; Tortuga, off the N.W.; and La Vache, off the S.W. coast. The largest rivers are the Artibonite, navigable for nearly 100 m., the Grand Anse, and the Trois Rivières. The most extensive inland sheet of water is the Étang Saumâtre in the S.E., which is 60 m. long N.W. to S.E. and 22 m. wide. Mountains comprise about 80 p.c. of the area.

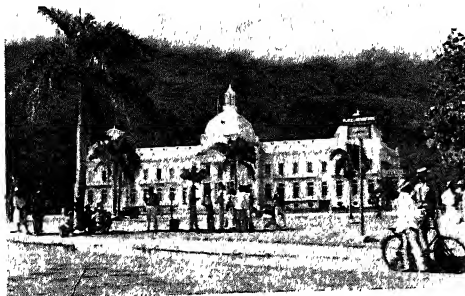
Ports, besides the capital, are Port de la Paix, Gonaïves, Jacmel, St. Marc, Cap Haïtien, Jérémie, Aux Cayes, and Miragoane. Torrid heat prevails on the lowlands, but the climate is more equable in the higher regions. The flora is profuse, but the fauna is limited, the largest mammal being the agouti. Mineral resources are scarcely worked, although several concessions have been granted; among minerals known to exist are gold, silver, copper, tin, nickel, anti-

mony, sulphur, iron, gypsum, kaolin, limestone, and porphyry. Agriculture is the chief industry, and more varied crops are exported than from anywhere else in the W. Indies. Haiti grows coffee, cocoa, cotton, sisal, tobacco, bananas, sugar, and molasses.

Haiti is governed under a constitution of 1935, amended 1939 and 1944. A national assembly of 37 deputies and 21 senators is popularly elected by male suffrage: deputies sit for four years, senators for six, and together they choose a president for seven years. D. Estime took office Aug. 16, 1946. Women over 30 may hold public offices. Elementary education is free and compulsory; in 1946 some 87,000 pupils attended 1,060 schools. Religion is Roman Catholicism. Wages are lower than elsewhere in the W. Indies, and agricultural produce cheaper. There are only 158 m. of rlys. and 975 m. of motor road. Weights and measures follow the metric system. Pop. (1950) 3,111,973.

In 1915 the U.S.A. landed a naval force and remained in occupation to 1934. A U.S. fiscal adviser remained until 1941. An armed constabulary put down lawless bands which had ranged the hills and burnt peaceful villages. Yellow fever and smallpox disappeared, malaria became less rampant with advances in education and sanitation; many new roads were constructed; hospitals were erected; prisons cleansed. The boundary with the Dominican Republic was settled in 1936. In 1941 Haiti declared war on Japan, Dec. 8; on Germany and Italy, Dec. 12; on Bulgaria, Hungary and Rumania, Dec. 24. *Consult* Black Democracy, H. P. Davis, 1936; The Haitian People, J. G. Leyburn, 1941.

**Hai-Yang-Tao, BATTLE OF.** Naval engagement in the Chino-Japanese War, Sept. 17, 1894. The Chinese admiral, Ting, fell in with the Japanese fleet under Ito off the Yalu river. Although stronger in point of armament, Ting was unable to cope with the mobility of the Japanese fast cruisers, and was utterly defeated, being forced to take refuge under the guns of Port Arthur (*q.v.*).



Haiti. Presidential palace at Port au Prince, the capital of this West Indies republic

**Hajdú-Szoboszló.** Town of Hungary, in the co. of Hajdú. It stands in a pastoral region, 12 m. S.W. of Debreczen, and the inhabitants are engaged in cattle-rearing and agricultural pursuits.

**Hajipur.** Subdivision and town of Bihar state, India, in Muzaffarpur district. Area of the subdivision, 798 sq. m. It is a fertile tract and is extensively cultivated. Hajipur town is on the Gandak, close to its junction with the Ganges at Patna, and is on the main line of the Bengal and N.W. rly. The town contains an ancient mosque and Hindu temples, and has commercial importance. Pop. 21,963.

**Hake** (*Merluccius vulgaris*). Large fish of the cod family. It is fairly common around the British



Hake, one of the cod family, caught off the British coasts

coasts, especially off Cornwall, where it preys upon the pilchards. It is rarely over 3 ft. in length, and is dark grey on the back and lighter below. The head is somewhat flattened, and there is an absence of the barbels seen in some species of the group. It is an important food fish, as its flesh is white and of good flavour.

**Hake, THOMAS GORDON** (1809-95). British poet. He was born at Leeds, March 10, 1809, and educated at Christ's Hospital and Glasgow university. His first poem, *The Pyramids*, was published in 1839, but most of his writing was done after the age of 50, when he had retired from medical practice. Among his poems are *Madeleine*, 1871; *Parables and Tales*, 1872; *New Symbols*, 1876; *Maiden Ecstasy*, 1883. They won the enthusiastic praise of his friends the Rossettis. Hake died Jan. 11, 1895.

**Hakim.** Title given among various Mahomedan peoples to persons holding judiciary offices, e.g. the chief administrators of certain districts in Persia. The meaning of the word is "one who commands." *Pron.* hah-kim.

**Hakka** (Chinese, strangers). People of mixed Chinese and aboriginal stock, mostly in S. China. Issuing from Shantung before 250 B.C., they now number several millions in Kwangtung, Kwangsi, and Fukien, with 500,000 in Formosa, and virile colonies in Tong-king, the islands of Indonesia, and the

Straits Settlements, besides many emigrants to Australia, S. Africa, and California. They are thrifty husbandmen and labourers, forming separate communities, with a dialect akin to Mandarin.

**Hakkōichiu.** Political principle originating in China, signifying "eight corners of the world under one roof," and designed to express the concept of the equality and brotherhood of all races in an ordered world. It was borrowed and perverted by Japanese political philosophers in the 1930s, and was used both in Japan and abroad to spread the conception of an ordered world under Japanese domination. From this point of view, the "Greater East Asia co-prosperity sphere" was simply the first instalment of a Japanese system of world domination. When in July, 1940, Prince Konoze formed his second cabinet, he announced a programme of social reconstruction and external expansion in which *hakkōichiu* played a prominent part.

**Hakluyt, RICHARD** (c. 1552-1616). English geographer. Of remote Dutch extraction, he was born in Herefordshire and educated at Christ Church, Oxford. Having taken orders he became chaplain to the embassy at Paris, 1583, where he collected all available material about French and Spanish voyages to all parts of the world. In 1588 he returned to England, and the following year published *The Principall Navigations, Voiages, and Discoveries of the English Nation*, enlarged ed. in 3 vols., 1598-1600. In 1590 Hakluyt became rector of Wetheringsett, Suffolk, and in 1604 archdeacon of Westminster. He used his influence to encourage the colonisation of Virginia. In addition to his published works, he left MSS., many of which were printed by the Hakluyt Society. He died Nov. 23, 1616, and is buried in Westminster Abbey.

A cousin Richard, of whose life little is known, was one of the men chiefly responsible for sending Froisher on his voyages, and a correspondent of practically all the ocean navigators of his period. *Pron.* Hakloot. *Consult* Life, F. Watson, 1924; R. H. and

the English Voyages, G. B. Parks, 1929; R. H. and His Successors, ed. E. Lynam, 1946.

**Hakluyt Society.** British society for printing hitherto unpublished works of early travel. Named after Richard Hakluyt, it was founded in 1846 to print "the most rare and valuable voyages, travels, and geographical records . . . to the circumnavigation of Dampier." Narratives as late as the 19th century are now published. By 1946 the Society had issued 227 vols., including Raleigh's *Guiana* and Columbus's *Journal*. The offices are at the British Museum.

**Hakodate** or **HAKODADI.** A former treaty port of Japan, at the S. extremity of the island of Hokkaido. It stands on a peninsula in the strait of Tsuguru, 18 m. N. of Omasaki on the neighbouring island of Honshu, and was opened to foreign commerce in 1859. It stands picturesquely at the foot of a rocky height, 1,150 ft. The deep and commodious harbour is almost landlocked, fully equipped with docks and quays. Exports normally include beans, peas, pulse, sulphur, charcoal, furs, lumber, and the



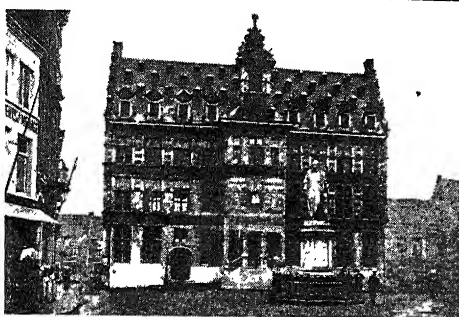
Hakodate, Japan. The harbour and town of the former treaty port

produce of the extensive fisheries. There is steamer connexion with other Japanese ports. The town was rebuilt after a disastrous fire in 1907. Pop. (1950) 228,994.

**Hakone.** Watering-place and small lake of Japan, on the island of Honshu. Its thermal springs, pure, sulphurous, and saline, range between 98° and 168° F. The lake, which lies to the N.W. of the resort at an alt. of 2,427 ft., is about 3 m. in length by 1 m. broad. The town is near Suruga Bay in the S.E. of the island.

**Hal.** A town of Belgium. It stands on the Senne, 9 m. S.S.W. of Brussels, in the province of Brabant. The chief building is the Gothic church of Notre Dame, built in the 14th century, and a

popular shrine for pilgrims. It is famous for its miracle-working image of the Virgin, its alabaster altar, the work of Jan Mone, bronze font, monuments, and other treasures, the gifts of kings and princes. There is a 17th cent. *hôtel de ville*, and the place has several manufactures, including sugar and paper. Pop. 16,000.



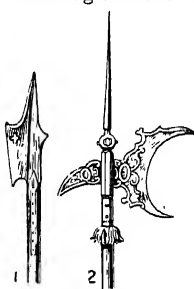
Hal, Belgium. Hôtel de Ville, and statue of A. F. Servais, the violoncellist

**Halation.** Spreading of the light in a photograph when a brightly illuminated portion of a subject is surrounded by deep shadow or vice versa. It is commonly seen when windows and lights are included in interiors or branches of trees, etc., against a bright sky in landscapes. It is caused by the oblique reflection of light from the back surface of the plate or film and is minimised by backing with an anti-halo non-reflective coating which dissolves during development.

**Halberd** or **HALBERT** (old Fr. *halebarde*). Late medieval weapon consisting of a combined pick and

axe with a pike-head, attached to a shaft 5 ft. or 6 ft. long. The bearers of halberds were known as halberdiers, and came to be employed chiefly on ceremonial occasions. The weapon, in a somewhat modified form, is still carried by the English yeomen of the guard. The phrase to send anyone to the halberds, i.e. to punish him, arose from the fact that at one time soldiers were flogged while tied to halberds fixed in the ground. See Arms; Pike.

Halberd. 1. Swiss, 14th century. 2. German, 16th century



**Halberstadt.** Town of East Germany, E. of the Harz Mts. in the *Land* of Saxony-Anhalt. On the Holzemme, it is 30 m. S.W. of Magdeburg. Until severely damaged during the Second Great War it was famous for well preserved medieval architecture. Within the framework of a whole inner town on the Gothic plan

stood a cathedral of the 13th-15th centuries; the churches of Our Lady and S. Martin, both 12th century; a Gothic town hall with Renaissance additions (1381); and remarkable timbered houses, especially the Ratskeller, the old banqueting hall of the town council. Halberstadt, seat of a bishopric from 814, became a market town in 989. The bishopric was eliminated in 1648, and a secular principality, with seat and vote in the Reichstag, created under Brandenburg, embodied with Prussia in 1813. Industries were concerned with sausages, sugar, chocolate, agricultural machinery, leather goods, and textiles. Pop. (pre-war) 50,372.

**Halcyonē.** Incorrect transliteration of *Alcyonē* (q.v.), due to a fanciful connexion with the Greek word *hals*, salt. *Pron.* Hal-si-onee.

**Haldane,** RICHARD BURDON HALDANE, VISCOUNT (1856-1928). British statesman. Born July 30, 1856, the son of a Scottish lawyer, he was educated at Edinburgh academy and university and at Göttingen. His remarkable gifts won him distinctions in philosophy, but he chose the bar for a

career, and became an English barrister in 1879 and Q.C. in 1890.

In 1885 Haldane was returned to parliament for Haddingtonshire (East Lothian). He became generally known as a Liberal Imperialist during the S. African War. Liberals were not unanimous in approving his appointment as secretary for war in 1905, but he held that position until 1912, just after he had been raised to the peerage as Viscount Haldane of Cloan, and during his term of office founded the Territorial Army and created an imperial general staff. He was next lord chancellor, but was forced to retire in 1915 when public opinion turned against him for his avowed admiration of German scholarship and false assumptions about an official visit to Germany, 1912. In 1924 he returned to the wool-sack in the first Labour government, and later led the Labour party in the lords.

Haldane, who died unmarried, Aug. 19, 1928, was awarded the O.M. in 1915. He had been F.R.S. since 1906. His work as a philosopher is inseparable from his interest in education. He was president of the royal commission on London university which reported in 1913, and helped on the establishment of several universities (including Bristol, of which he became chancellor); while his support of the Workers' Educational Association increased its prestige.

The basis of his work as statesman, adviser, lawyer, or teacher, lay in his broad philosophy. He was a Hegelian and strove, with some success, to interpret the findings of modern science in terms of neo-idealism. His Gifford lectures, published in 1903 as *Pathway to Reality*, combine metaphysical speculation with an acute perception of scientific tendencies. Other notable works were *The Reign of Relativity*, 1921, and *The Philosophy of Humanism*, 1922. By many he is considered the finest minister for war Great Britain ever had. To him goes the credit for the efficiency of the B.E.F. in 1914. Only a man of great character could have endured with such dignity the injustice of which he was the victim. His Autobiography appeared in 1929. Consult Life, Sir F. Maurice, 1937.



Viscount Haldane, British statesman Russell



Halberstadt, Germany. The Gothic Ratskeller, built in 1461, a fine example of woodwork

**Haldane, JAMES ALEXANDER** (1768–1851). A Scottish preacher. Born at Dundee, July 14, 1768,



*J. Haldane*

and educated at the grammar school and Edinburgh university, he made four voyages to the East as a midshipman, then a series of evangelistic tours in 1797. He founded the Society for Propagating the Gospel at Home. Leaving the Church of Scotland, he became pastor of the first Congregational church in Scotland, taking no salary and devoting the income to his society. In 1808 he joined the Baptists, and from that time was engaged in theological controversies. His many writings include *The Duty of Christian Forbearance in Regard to Points of Church Order*, 1811. Haldane was assisted in his work by his brother Robert, and died in Edinburgh, Feb. 8, 1851.

**Haldane, JOHN BURDON SANDERSON** (b. 1892). A British scientist. Son of J. S. Haldane (*v.i.*), he was born Nov. 5, 1892, went to Eton and New College, Oxford, and was trained as a biologist. After service in the Black Watch in the First Great War he was reader in biochemistry at Cambridge for ten years. In 1932 he was elected F.R.S. and president of the genetical society. Professor of genetics at University College, London, 1933–37, he held, 1937–57, a chair of biometry there specially created for him. He was chairman of the board of the Daily Worker 1940–49.

He combined exceptional ability as a research worker with a readiness to experiment upon himself. After the loss of the British submarine *Thetis* in 1939, he conducted dangerous experiments to test the effects of various gases on the human system. He worked similarly with war gases with a view to improving respirators. He belonged to several foreign scientific organizations, and wrote provocative essays and speculative works on biology and kindred

sciences. His publications included *Daedalus*, 1924; *Possible Worlds*, 1927; *The Inequality of Man*, 1932; *Heredity and Politics*, 1938; *A.R.P.*, 1938; *Science Advances*, 1947; *Everything Has a History*, 1951; and a vol. of scientific fairy tales, *My Friend Mr. Leakey*, 1937. He went to the India statistical office, Calcutta, in 1957.

**Haldane, JOHN SCOTT** (1860–1936). A British scientist. Born May 2, 1860, the younger brother of Viscount Haldane, he was educated at Edinburgh Academy and the universities of Edinburgh and Jena, graduating in medicine. He made a special study of the respiratory functions, particularly in relation to industrial occupation. In 1905 he published, with Priestley, researches showing that the regulation of the breathing is determined by the tension of carbon dioxide in the respiratory centre of the brain, which in turn is highly sensitive to the tension of carbon dioxide in the blood reaching it.

Haldane was made F.R.S. in 1897, and was reader in physiology at Oxford, 1907–13. Before the First Great War his investigations led to a radical alteration in the army's active service rations. During the war he worked on anti-gas measures. He served on government inquiries into industrial physiology, and delivered the Silliman lectures at Yale, the Gifford lectures at Glasgow, and the Donnellan lectures at Dublin. He was created C.H. in 1928. His books include *Mechanism, Life and Personality*, 1913; *Organism and Environment*, 1917; *Materialism*, 1932; *The Philosophy of a Biologist*, 1935. He died at midnight, March 14–15, 1936. His son was the scientist, J. B. S. Haldane, and his daughter Naomi Mitchison, the novelist.

**Hale.** Urban dist. of Cheshire, England. On the river Bollin, overlooking the plain of Cheshire, it is a residential suburb on the S. side of Manchester. It was created an urban dist. in 1900, and has its own railway station. Pop. (1951) 12,155.

**Hale.** Stage name of a British theatrical family. Robert Hale-Monro (1874–1940) was born at Newton Abbot, March 25, 1874, and first appeared on the London stage in 1891. He made his reputation as a comedian in George Edwardes's musical shows at the Gaiety Theatre, *e.g.* *The Girls of Gottenburg*, 1907; *Our Miss Gibbs*, 1909; and played in pantomime for years. He was

seen in *Sons o' Guns*, 1930; *Bow Bells*, 1932; and died April 18, 1940.

His daughter Beatrice Mary (born at Liverpool, May 22, 1899) became a musical comedy star under the name Binnie Hale, in *No, No, Nanette!* 1925; *Sunny*, 1926; *Mr. Cinders*, 1928, etc. His son John Robert (born in London, May 1, 1902), known as Sonnie Hale, was a popular comedian in revue and on the radio.

**Hale, EDWARD EVERETT** (1822–1909). An American author. Born at Boston, Mass., April 3, 1822, nephew of the orator Everett, he was educated at Harvard. He held various pastorates, and was founder and editor of *Old and New*, a magazine finally merged in *Scribner's Monthly*. His *Ten Times One is Ten*, 1870, contributed to the establishment of charitable clubs: but he is best known by *The Man without a Country*, a story which, appearing anonymously in *The Atlantic Monthly* in 1863, did much to maintain a spirit of loyalty to the union. He died June 10, 1909.

**Hale, GEORGE ELLERY** (1868–1938). An American astronomer. Born at Chicago, June 29, 1868, he was educated at Cambridge, Mass., and established the private Kenwood Observatory where in 1890 he invented the spectroheliograph for studying the sun in monochromatic light. Hale was appointed first director of the Yerkes Observatory in 1897 and of the Mt. Wilson Observatory in 1904. Here in 1908 he discovered the magnetic field of sunspots, and in 1913 indications of the general magnetic field of the sun; and here under his direction were erected the 60-in. and then the 100-in. telescopes, with which many of the major astronomical discoveries of the first half of the 20th century were made. His enthusiasm led to the inception in 1928 of the 200-in. telescope, and he saw much of the design and construction completed before his death. Hale was awarded the gold medal of the royal astronomical society in 1904 and the Copley medal of the royal society in 1932. He founded the *Astrophysical Journal* in 1895, remaining editor till 1933. He wrote *The New Heavens*, 1923; *The Depths of the Universe*, 1924; *Beyond the Milky Way*, 1926; *Signals from the Stars*, 1932. Hale died at Pasadena on Feb. 21, 1938.

**Hale, JOHN PARKER** (1806–73). An American statesman. Born at Rochester, New Hampshire,

March 31, 1806, he was admitted to the bar in 1830. During 1834-41 he was district attorney for his state. In 1842 he entered congress as a democrat and soon showed strong anti-slavery principles, which met with violent opposition from his constituents, but by a campaign known as the Hale Storm of 1845 he won New Hampshire to his cause. In 1847 he entered the senate and with Chase, Seward, and Sumner organized a weighty opposition to slavery. In 1847 and in 1852 he was nominated for the presidency, but withdrew in favour of Van Buren in the former year, and was defeated in the latter. A staunch supporter of Lincoln, Hale served in the senate until 1865, when he retired and became minister to Spain for four years. He died Nov. 19, 1873, at Dover, N.H.

**Hale, Sir Matthew** (1609-76). An English lawyer. Born Nov. 1, 1609, at Alderley, Glos, the son of a lawyer, he was educated at Magdalen Hall, Oxford, and after studying for the Church turned to the law. In 1637 he became a barrister and was soon engaged in great cases, appearing on behalf of Laud. Never a partisan, he accepted the dominance of the parliamentarians, and his prosperity continued after the death of Charles I.; in 1653 he was the first judge appointed by Cromwell, and in 1655 was elected to parliament. In 1660 Charles II made him chief baron of the exchequer and in 1671 chief justice of the common pleas. He died Dec. 25, 1676. A man of great learning and industry, Hale wrote books on religion and mathematics, as well as histories of the common law and pleas of the crown. Consult *Fourteen English Judges*, Lord Birkenhead, 1926.

**Hales, Stephen** (1677-1761). British scientist. Born at Bekebourne, Kent, Sept. 7, 1677, he was educated at Cam-

bridge. Having been ordained, he became perpetual curate of Teddington, where he passed his days from 1709, although he held other livings. He introduced the methods of weighing and measuring into his experiments on living plants, and so laid the solid foundations upon which modern botany has been built. His two books, *Vegetable Statics*, 1727, and *Haemostatics*, 1733, consist of the memoirs in which he communicated his discoveries to the Royal Society. He was a founder member of the Society of Arts. Hales died at Teddington Jan. 4, 1761. A biography by A. E. Clarke-Kennedy appeared in 1929.

**Halesowen.** Market town and borough of Worcestershire, England. It is 9 m. by rly. W. of Birmingham, on the Stour and under the Lickey Hills. There are excellent canal facilities. William Shenstone, who was born at the Leasowes, is buried in the churchyard of the ruined abbey of SS. Mary and John the Baptist. Caslon the printer, Attwood the reformer, and F. Brett Young the novelist were born here. There is an old grammar school. The town makes iron and steel goods. Cradley, a centre of nail and chain manufacture, is in Halesowen, which became a borough in 1936. Oldbury and Halesowen is the name of a bor. constituency. Market day, Sat. Pop. (1951) 39,884.

**Halévy, Elie** (1870-1937). A French historian. Born at Étretat, Sept. 6, 1870, the son of Ludovic Halévy (q.v.), he became a professor at the École Libre des Sciences Politiques in Paris. He is chiefly known for a masterly *History of the English People in the 19th Century*, Eng. trans. 1924-27. He died Aug. 21, 1937.

**Halévy, Jacques François Fromental Elie** (1799-1862). French composer. Born in Paris of Jewish



Fromental Halévy,  
French composer

parentage, May 27, 1799, his real name was Levi. He studied at the Conservatoire, then under Cherubini, and, after going to Italy with the *grand prix*, returned to France to devote himself to the composition of operas. His best work is in *The Jewess*, and *The Lightning*, both 1835. Professor at the Conservatoire from 1827, he trained Gounod and Bizet. Halévy was secretary of the Academy of Fine Arts and chevalier of the Legion of Honour. He died March 17, 1862.

**Halévy, Ludovic** (1834-1908). A French dramatist and novelist. He was born in Paris, Jan. 1, 1834, and started early to write for the stage, operettas, vaudeville pieces, and comedies, many in collaboration with Henri Meilhac (1831-97). Most noteworthy are *Orphée aux Enfers*, 1861; *La Belle Hélène*, 1864; *Froufrou*, 1869; the first two set to music by Offenbach, the last a more serious piece. Halévy published volumes of his collected short stories, notably *Monsieur et Madame Cardinal*, 1873, and several novels, of which the best is *L'Abbé Constantin*, 1882. He was elected to the French Academy in 1884, and died in Paris, May 8, 1908.



L. Halévy

**Halfaya.** A locality on the Egyptian-Libyan border, close to Sollum, the scene of fierce fighting during the N. Africa campaigns of the Second Great War. The coastal road here climbs the escarpment through Halfaya Pass. Halfaya was occupied by Italians during their advance into Egypt in Sept., 1940, and recaptured by the British Dec. 15. In April, 1941, a combined German-Italian force entered. The position was heavily fortified, and although isolated in Nov. when Rommel retreated W., the defenders held out until Jan. 17, 1942. In June the Germans and Italians regained possession of Halfaya Pass when



Sir Matthew Hale,  
English lawyer  
From a portrait in  
Lincoln's Inn



Halfaya Pass, North Africa. Air view taken Nov., 1942, showing Rommel's armoured vehicles retreating over the escarpment after the battle of Alamein  
British official, Crown copyright reserved



Gen. Auchinleck's forces withdrew to Alamein. After the victory of Alamein the pass was taken, Nov. 10, by N.Z. and British troops.

**Half Blood.** Relationship between persons deriving from the same father or mother, but not from the same father and mother. Whole blood is relationship between persons deriving from the same couple of ancestors. Under the old English feudal law regulating title by descent, the basic principle of collateral inheritance was that the heir to a *feudum antiquum* must be of the whole blood of the first feudatory or purchaser. Actual proof of such lineal descent gradually becoming impossible, the law substituted reasonable proof, requiring only that the claimant should be next of the whole blood to the person last in possession. A distant kinsman of the whole blood was admitted, or an estate even allowed to escheat to the lord, rather than that the half blood should inherit.

Obvious hardships inevitably resulted. Thus, if a father had two sons by different wives, these half brothers could not inherit from each other, so that if the elder succeeded his father in the estate and died without issue, the younger was deprived of inheritance as being only of half blood to the person last seised. Whereas had the elder brother predeceased the father, the younger could have inherited, not as heir to his half brother but as heir to their common father who was the person last actually seised. In England this, with other hardships, was abolished in 1833. Under the present law, brothers and sisters and uncles and aunts of the half blood are entitled to succeed to the property of an intestate immediately after whole blood relatives in the same degree.

In the U.S.A. the laws affecting the half blood vary in different states. In some, relatives of the half blood inherit equally with those of the whole blood in the same degree; in others they inherit only if none of whole blood exist. In Louisiana natural children, if acknowledged, may inherit from both parents if no lawful issue exists. See Family; Inheritance; Kinship.

**Half Cock.** Position of the bolt of a rifle when it is pulled back to half its full extent and retained in that position by the sear. This prevents the firing of the weapon.

**Half Pay.** Rate of pay issued to officers of the navy and army

who have for some reason ceased to do duty, have been removed from their corps, appointment, or command, but remain on the active list and are thus still eligible for employment.

**Half-Timber.** Building term to denote heavy timber framing, usually in oak, with the spaces between filled with materials, the timbering being left exposed. Half-timbering was introduced into England in the Middle Ages and reached its highest development there in the well wooded districts of Gloucestershire, Herefordshire, Cheshire, Shropshire, and S. Lancashire.

In earlier forms the walls were actually half of timber and consisted of posts and panels of equal width. The space between the timbers was filled with a mixture of clay and straw, called pugging, in which stakes were embedded. The pugging was covered inside and out with a coating of plaster. Brick was later used instead of pugging for the panels, which were left unplastered; and the timbering was elaborately carved, while the panels were divided into squares containing devices formed by variously cut strips of wood. Half-timber work fell into disuse towards the close of the 18th century. See Holborn illus.

**Half-Timer.** Name given to a child who attended school for roughly half the normal hours and went to work during the others. The arrangement was common in the textile industry. The earliest cotton mills relied principally on child labour, poor law authorities "apprenticing" pauper children to the mill owners. Peel's Factory Act, 1802, required employers to provide adequate instruction in reading, writing, and arithmetic during working hours. The Factory and Workshops Act, 1878, forbade the employment of children under 10, but allowed those under 14 to be employed half-time. The Factory and Workshop (Consolidation) Act, 1901, prohibited the employment of children under 12, but permitted employment half-time of other children under 14, provided that the employer obtained weekly a certificate of school attendance. The Education Act, 1870, authorised local authorities to pass by-laws permitting children to become half-timers provided they had attained a certain educational standard. In 1911-12 there were more than 70,000 recognized half-timers.

Public opinion gradually hardened against the practice, and the

Education Act, 1918, prohibited such half-time attendance at school. From 1921, local authorities could not grant exemption from school to any child under 14. The Employment of Women, Young Persons, and Children Act, 1921, made illegal the employment in industry of any child under 14. The Education Act, 1944, imposed on local authorities the duty of enforcing the attendance at school of every pupil.

**Half-tone.** Photo-mechanical process of making typographic printing blocks and photolithographic plates from full-tone originals, such as photographs or wash-drawings, as distinguished from those in line. While the making of line blocks by photo-etching became commercially practicable as early as 1860-70, some years passed before a satisfactory method was devised for breaking up full-tone originals into a form printable with type. No one inventor of half-tone can be claimed. In the earlier processes of Pretsch, Dallas, and Negre a gelatine relief was made from a negative of the original. This relief was rendered conductive with graphite and an electrotype made from it.

Other inventors broke up the image by placing a ruled or irregular screen in front of the sensitive plate when photographing the original, with the object of replacing the continuous tone by a fine pattern of dots or other form. This method is now commercially used in making half-tone blocks, but the present process, which is purely optical and is carried out with great rapidity, was evolved directly from a mechanical and tedious method independently worked out by Petit in France and Ives in America in 1878. These experimenters, the first to produce successful half-tone engravings, made a plaster cast from a gelatine relief of the original, the highlights forming the raised parts and the shadows the hollows. The cast was blackened on the surface and ruled through, line by line, with a V-shaped tool, the action of the cutting V on the black relief causing the highlights of the picture to be formed by fine black lines where the white ground of the plaster is most deeply cut; the shadows by fine white lines cut away by the point of the V; and intermediate tones by corresponding portions of white and black lines. The excised relief was then photographed, a resist-image printed from the negative on to metal, and the latter etched. Ives per-

ceived that this translation of the original into minute units of black and white, in correspondence throughout with the tones from highlight to shadow, could be simply done by photographing the original on to a sensitive plate having a fine ruled screen of crossing opaque lines placed at the requisite distance close in front. Cross-line screens for this purpose were made by Levy of Philadelphia about 1891, and half-tones speedily came into general use, first for magazine and book illustration, later in newspapers.

In the practical making of half-tone blocks, the original is photographed with a screen of fineness corresponding with the quality required in the print and the smoothness of the paper. For magazine illustration a screen of 120 or 133 lines per inch is commonly used; for newspaper half-tones, one of 65 to 100 lines; and for the finest catalogues and book illustrations, 150 to 175 lines. The action of the screen at a short distance from the photographic plate or film consists in the formation on the latter of a dot from every aperture produced by the crossing of the lines of the screen, these dots automatically ranging in size from mere separate points in the highlights of the negative—which correspond to the shadows of the original—to larger units which unite to form a honeycomb pattern in the middle tones, and an almost solid black in the areas of the negative corresponding to the high-lights of the original. From this screen-negative a resist-image is printed on metal, usually copper, although zinc is used. The metal is usually sensitised by the enameline process, i.e. by coating with a solution of fish-glue and ammonium bichromate, which is flowed on and thinly and evenly distributed by whirling the plate.

After drying and printing under the negative, whereby the light-affected parts are rendered insoluble, the plate is rinsed, and usually is then dipped in a dye bath of methyl violet to render the thin image plainly visible. The soluble parts of the coating are removed in running water, and the plate, after drying, is "burnt in," i.e. heated to a temperature at which it scorches wood, whereby the fish-glue image is converted into a hard enamel-like substance which is an effective resist of the etching solution. The latter is ferric chloride for copper, nitric acid for zinc. As with line blocks, half-tones are now mostly etched



Half-tone. The same subject as reproduced through six different screens. (1), 150 lines per inch; (2), 135; (3), 120, the screen used for the New Universal Encyclopedia blocks; (4), 100; (5), 80; (6), 64; 5 and 6 being commonly used for newspaper illustrations. See text

by the corrosive spray of a machine, or electrolytically.

The next operation is "fine" etching or re-etching, called "staging" in America. The plate up to this point is said to have been "flat-etched." Fine etching consists in lightening parts of the plate by further treatment in the etching bath or machine, the other portion of the plate being covered with etch-proof varnish. This artist's work is carried out to improve the quality of a block, e.g. making an object stand out against its background by lightening the tone of the latter, but it also improves tonal gradation and contrast of the reproduction.

The half-tone process, unaided by fine etching or other retouching,

does not yield correct gradation. Lighter and darker tones tend to be flattened, while middle tones are too light. Fine etching overcomes this lack of brilliancy. A plate may also be improved by mechanical means. Parts can be made to print darker by rubbing with a burnisher, a highly polished steel blade with rounded edges; or parts may be lightened with a roulette, a milled steel tool which can impress minute holes.

The last stages in making a half-tone plate are routing, lining, mounting, and piercing, for all of which special machines have been devised. Routing is cutting away the metal of the plate by a high-speed tool like a drill. It is used for blocks where, for example, a

head or a machine is required to print without a background. Lining is putting round the rectangular picture a line or rule, or a series of line borders. This is done, as a rule, also by the machine which bevels the plate. The plate is next mounted suite-high on hard wood or other suitable material, and the whole may be "pierced" again by a high-speed cutting tool, if it is required to provide space for type among several pictures on a single block. Although the making of a half-tone block involves so many separate operations, this branch of photo-engraving has become so highly organized and accelerated by mechanical appliances that the whole process can be done in a few minutes; and new materials are continually being brought into use to improve results, reduce costs, etc.

The preparation of a half-tone photo-lithographic printing plate involves operations fairly similar to those described for the production of half-tone letterpress blocks up to the etching. The planographic image obtained on the metal at this stage is then printed by the lithographic process. Fine etching is replaced by retouching on the half-tone photographic plates.

**Haliartus.** Town of ancient Greece, in Boeotia, situated on the S. shore of Lake Copais. Said to have been destroyed by Xerxes during his invasion of Greece, it was rebuilt and became important. The site and ruins of Haliartus are near the modern village of Mazi. In 171 B.C. it was besieged by the Romans, and its territory handed over to Athens, 167.

**Haliburton, THOMAS CHANDLER** (1796-1865). Canadian judge and author. Born at Windsor, N.S., son of a justice, and educated at the grammar school and King's College, he was called to the bar in 1820, became chief justice of common pleas, 1828-40, and judge of the supreme court, 1842-56, after which settled in England.



T. C. Haliburton,  
Canadian judge

He was M.P. for Launceston, 1859-65, and died at Isleworth, Aug. 27, 1865. Founder of the American school of dialect humour, he is famous as the creator of Sam Slick, Yankee clockmaker and pedlar, whose drolleries and wit first found expression in The Nova Scotian newspaper in 1835.

In addition to The Clockmaker, or Sayings and Doings of Sam Slick of Slickville, 1837-40, he wrote The Attaché, or Sam Slick in England, 1843-44; Sam Slick's Wise Saws and Modern Instances, 1853. To encourage Canadian literature a Haliburton Society was founded at Windsor, N.S. A Life, by V. L. O. Chittick, appeared in 1925.

**Halibut** (*Hippoglossus hippoglossus*). Largest of the flat fishes. It occasionally attains a length of



Halibut, the largest flat fish

over 7 ft., but is usually between 4 ft. and 5 ft. The body is thick and narrow, and brown on the upper side. Generally found at some distance from the shores to a depth of 100 fathoms, it is taken by trawling. Its food consists of fish and the smaller crustaceans. It is extremely prolific and an important food fish.

**Halibut Liver Oil.** Oil expressed from the liver of halibut. It is extremely rich in vitamin A. The quantity of the vitamin present varying considerably, the oil is let down by the addition of vegetable oils to ensure standardization. Vitamin D is then added to a concentration 60 times that in cod liver oil. Halibut liver oil conveys constituents to the body without excess of fat, and is often happily taken where cod liver oil is not.

**Halicarnassus** (mod. Budrum). Ancient Greek city of S.W. Asia Minor, originally a Dorian colony. The colonists mingled with the Carian and Ionian population of the region. It came under Persian rule in the 6th century B.C.; its queen Artemisia led a squadron to the aid of Greece in 480 B.C. In the 4th century it was the seat of an important Carian dynasty. On the death of Mausolus, one of these kings, in 353, his widow Artemisia built the tomb known as the Mausoleum (*q.v.*), regarded as one of the seven wonders of the world. Halicarnassus was the birthplace of the historians Herodotus and Dionysius. It was besieged and taken by Alexander in 334.

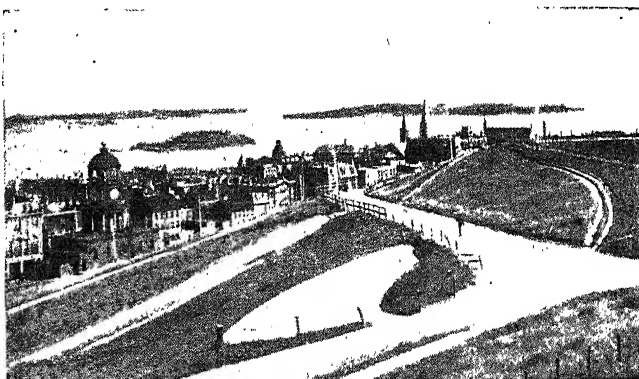
**Halicz** or **GALICZ**. Town of Ukraine S.S.R. It stands on the Dniester, 60 m. S.S.E. of Lvov, and is noted for the brine springs

in the vicinity. Salt and soap are manufactured, and there is some trade in timber. The medieval fortress of the princes of Halicz, which stands on an eminence, is now in ruins. The name Galicia is derived from that of this town.

At the partition of Poland in 1773 the town was included in Austrian Galicia. On Aug. 27, 1914, Halicz was captured by the Russians during their advance into Galicia, but was retaken by the Austrians in a counter-offensive at the end of June, 1915. Halicz was the scene of bitter fighting in July, 1917, and changed hands several times, the Russians being forced to withdraw in the end. Halicz was in the territory ceded by Russia to newly constituted Poland by the treaty of Riga, 1921. With the Russo-German partition of 1939 it returned to Ukraine S.S.R. It was in German hands 1941-Jan., 1945, remaining in Ukraine S.S.R. under the Russo-Polish treaty of Aug., 1945.

**Halidon Hill.** Battlefield in Scotland, 2 m. N.W. of Berwick-on-Tweed where, on July 19, 1333, a battle was fought between the English and the Scots. The English, under Edward III, were nearly all dismounted, and were divided into three divisions or battles, each composed of men-at-arms, with archers on their flanks. The Scots, under Sir Archibald Douglas, came up the hill in dense columns. Their attack was repulsed by the showers of arrows, only their left reaching the English, while the rest were driven down the hill, pursued by the English on horseback. The forces engaged were not large, and the losses of the English were light. The battle was fought by the Scots to save Berwick, but on their defeat the town was promptly surrendered to Edward.

**Halifax.** A type of bombing aircraft used by the R.A.F. in the Second Great War. Designed by Handley Page, Ltd., the Halifax was a four-engined mid-wing monoplane with twin fins and rudders; outstanding characteristics were the bomb capacity of over 5 tons, the extreme range of over 3,000 m., and the defensive armament housed in power-operated turrets. It first flew in Oct., 1939, and quickly proved its value. By the end of the war the various marks of Halifax had equipped over 40 p.c. of all heavy bomber squadrons and were used on most night raids on German industry. Special Halifaxes were adapted for airborne forces,



Halifax, Nova Scotia. The town and harbour seen from the citadel

**Halifax, EARL OF.** English title borne by the Savile, Montague, and Wood families. Its first holder was the statesman George Savile, who was made Viscount Halifax in 1667, and earl of Halifax in 1679. In 1682 he was advanced to a marquessate, but when his son William died in 1700 all the titles, save an old baronetcy, became extinct. At once, however, the Whig statesman, Charles Montague, was made Baron Halifax, and in 1714 he became an earl. On his death in 1715 the earldom became extinct, but the barony passed to his nephew George, who in the same year was made earl of Halifax. He was succeeded in 1739 by his son George, on whose death, 1771, the titles became extinct. The earldom was revived for Edward Wood in 1944.

**Halifax, GEORGE SAVILE, 1st MARQUESS OF (1633-95).** British statesman and author. The son of Sir William Savile, a Yorkshire baronet, he was born to wealth and station, his relatives including Shaftesbury and other prominent men. He was well educated, and learnt much from his



1st Marquess of Halifax.  
British statesman  
From a print

uncle, Sir W. Coventry. In 1660 he sat in Parliament, but his political career only began about 1667, when, his uncommon abilities having been recognized, he was made Viscount Halifax. He was employed on diplomatic work, and was an active member of the privy council and the House of Lords; about 1679 he became one of the king's chief advisers, and he was the leader of the opposition to the exclusion of James from the throne, the rejection of the Exclusion Bill being largely due to his efforts. He

was not, however, friendly to James. His policy as a leading member of the executive was throughout a moderating, though not always a successful one. He objected to the execution of Russell and Sidney; he tried to reconcile the king with Monmouth after the Rye House plot, and to establish more friendly relations between Charles and William of Orange. In 1679 he was made an earl, and in 1682 a marquess.

On the accession of James, Halifax lost his power, although for a while he was lord president. He spoke against nearly all the unconstitutional acts of the king, and his Letter to a Dissenter was instrumental in defeating the Declaration of Indulgence. He did not, however, join William of Orange on his landing; instead, he acted as a mediator, after which, to the chagrin of his Tory associates, he joined William and acted mainly with the Whigs. For a few critical days he was the acting head of the government; it was he who presided over the council that, after the flight of James, took steps to keep order, while as leader of the House of Lords he had a large share in arranging the settlement of 1689. As the nation's spokesman he formally offered the crown to William and Mary. Made lord privy seal, Halifax was one of the new king's chief advisers, but he had many enemies, and in 1690 he retired from the cabinet. He continued, however, active, mainly as a critic, until his death, April 5, 1695. He is buried in Henry VII's chapel, Westminster Abbey. He was twice married, and left a family. One grandson was the great earl of Chesterfield.

Halifax was a statesman and an orator, but his fame rests more upon his work as a thinker. The name of the trimmer, coined by himself, expresses his political ideas if the word is taken without the

more sinister associations that have grown up around it. He thought too clearly, and knew too much to be a mere party politician, while he anticipated many of the ideas of a later day. Unlike some theorists, he was never afraid to carry his moderating, if unpopular, precepts into practice. His wit was the admiration of all save those who winced under his sarcasms. Halifax's great work is *The Character of a Trimmer*, written in 1684. *Maxims of State* is another, while he wrote *The Character of Charles II, Some Political, Moral, and Miscellaneous Thoughts and Reflections*, and the *Anatomy of an Equivalent*. In his treatises on statecraft he put forward his idea of the state and its functions; unlike Hobbes, it was no appeal to first principles, but a guide to practical politics. *Consult Life and Letters*, H. C. Foxcroft, 1898.

**Halifax, CHARLES MONTAGUE, EARL OF (1661-1715).** British statesman. Born at Horton,



Earl of Halifax,  
British statesman  
From a print

Northamptonshire, April 16, 1661, he was a grandson of the 1st earl of Manchester. Both at Westminster School and Trinity College, Cambridge, he made his mark as a scholar; he was associated with Sir Isaac Newton, wrote verses, and studied philosophy. In 1689 as a Whig he entered Parliament as M.P. for Maldon, owing this and other favours to his friend the "magnificent" earl of Dorset. In the Commons he won an early reputation, and in 1692 was made a lord of the treasury, being advanced in 1694 to the post of chancellor of the exchequer.

In these years Montague introduced the important financial reforms which place him in the first rank of English financiers. He helped to found the Bank of England, was the leading spirit in reforming the coinage, and initiated the National Debt and the first issue of exchequer bills. In 1697 he was made first lord of the treasury. In 1698 Montague was accused of fraud; the charge was not proved, but his honesty was not equal to his talents, while his vanity brought him further enemies. In 1699 he resigned, taking the rich sinecure office of auditor of the exchequer which he had carefully provided for himself. In 1701 he was made a peer, taking the title of Baron Halifax.

Two unsuccessful attempts were made by the Tories to impeach him. He was employed on public affairs during Anne's reign, but political office came again only when George I became king. In 1714 he was made first lord of the treasury and created earl of Halifax, but he died May 19, 1715, leaving no children. Halifax loved the society of men of letters, who were entertained and rewarded by him; among his friends were Addison, Pope, and Prior, with the last of whom he collaborated in a parody of Dryden's *The Hind and the Panther*.

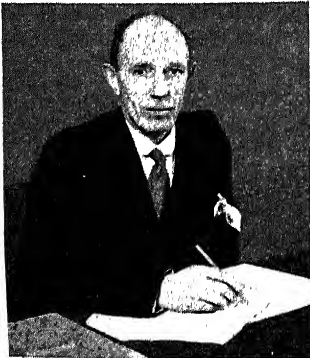
**Halifax, GEORGE MONTAGU DUNK, 2ND EARL OF (1716-71).** British politician. The son of



2nd Earl of Halifax,  
British politician

George Montagu, earl of Halifax, he was educated at Eton and Trinity College, Cambridge, succeeding to the earldom in 1739. He assumed the name of Dunk on his marriage. In political life from 1748, he was in turn president of the board of trade, lord lieutenant of Ireland, and first lord of the admiralty; in 1762 he was made secretary of state, and later lord privy seal, serving in the ministries of Bute, Grenville, and North. He died June 8, 1771, leaving no son.

**Halifax, EDWARD FREDERICK LINDLEY WOOD, 1ST EARL OF (b. 1881).** British statesman. He was born April 16, 1881, fourth son of the 2nd viscount, whom he succeeded in the title in 1934. Educated at Eton and Christ Church, Oxford, he was elected in 1910 as Unionist M.P. for Ripon, and served successively as under-secretary for the colonies, president



Edward Wood, Earl of Halifax,  
British statesman

of the board of education, and minister of agriculture, 1921-25. Then he was appointed viceroy of India and created Lord Irwin. He favoured the gradual development of India towards dominion status, and by firmness, tact, and sympathy for five critical years won the admiration even of political extremists. He was known in India as "the tall Christian."

Irwin retired in 1931 and was made K.G. Returning to home politics, he was successively president of the board of education, secretary for War, lord privy seal, and lord president of the council. In 1937 he visited Hitler to sound possibilities of agreement with Germany. On the resignation of Anthony Eden in 1938, Halifax was appointed foreign secretary, in which office he reluctantly supported the policy of appeasement towards Germany. From Dec., 1940, he was ambassador to the U.S.A. throughout the Second Great War, a successful and popular British visitor who did much to foster good understanding between the two peoples. He retired in 1946 and received the O.M.; he had been made an earl in 1944, this being the fourth creation. He published *Indian Problems*, 1932; *Speeches on Foreign Policy*, 1940; *Fulness of Days*, 1957.

**Halifax, CHARLES WOOD, 1ST VISCOUNT (1800-85).** A British politician. Born Dec. 20, 1800, he was the eldest son of a Yorkshire landowner, whom he succeeded in the baronetcy in 1846. He was educated at Eton and Oriel College, Oxford, and married a daughter of the 2nd Earl Grey. Having entered parliament as a Whig, he was joint secretary to the treasury 1832-34, and secretary to the admiralty, 1835-39. In 1846 he took office as chancellor of the exchequer, remaining there until transferred to the presidency of the board of control in 1852.

He was first lord of the admiralty, 1855-58, and secretary for India, 1859-66, seven difficult years. In 1866 he left office and was created Viscount Halifax, having represented that town in parliament since 1832. In 1870 he became lord privy seal, and when he left office with the Liberals in 1874 his long official life ended. He died at Hickleton, Yorks. Aug. 8, 1885.

**Halifax, CHARLES LINDLEY WOOD, 2ND VISCOUNT (1839-1934).** President of the English Church



2nd Viscount Halifax,  
English Churchman  
Lefayette

Union. Born in London, June 7, 1839, and educated at Eton and Christ Church, Oxford, he succeeded his father in the peerage in 1885. During 1862-70 he was groom of the bedchamber to the prince of Wales, and in 1886 became an ecclesiastical commissioner. For 50 years he was a recognized leader of the High Church party, and from 1867 to 1919 was president of the English Church Union. He opposed disestablishment and divorce laws, and was an ardent advocate of the reunion of Christendom. He died Jan. 19, 1934.

**Halitosis.** Offensive breath, which is nearly always accompanied by a bad taste in the mouth. It may arise from septic tonsils and unhealthy conditions of the mucous membranes of the upper respiratory tract. The odours of certain drugs and foods are exhaled with the breath, while characteristic breath smells are present in uraemia, alcoholism, some forms of diabetic coma, etc. The common causes are an unclean mouth associated with dental decay or pyorrhoëa; or a liver disfunction. Treatment is that of the underlying cause.

**Halkett, HUGH HALKETT, BARON VON (1783-1863).** British soldier. He was born at Musselburgh, Aug. 30, 1783, entered the army, and saw service in India. In 1803 he took a commission under his brother Colin in the German legion, a body of Germans in the pay and service of England. He went with the legion to Portugal in 1808, won fame at Albuera, and for the rest of his life was an officer of the Hanoverian army. He was made a noble and appointed inspector-general of infantry, led some Hanoverians at Waterloo and had a high command in the war of 1848 against the Danes. He died July 26, 1863. His brother, Sir Colin Halkett (1774-1856), was first in the service of Holland. Having commanded a battalion of the German legion in the Peninsular War, he led a brigade at Waterloo.

**Hall.** Word used originally for a large room. It was specially applied to the room in which kings and others in authority received



1st Viscount Halifax,  
British politician



suppliants, hence the phrase, the hall of justice. The same room was also used for feasts and ceremonies and in castles and other large residences as a dining-room for the household, a use which persists in the halls of colleges, public schools, and similar institutions. The hall was the place where burgesses of a town or members of a guild met, hence town hall and guildhall. A further use, arising out of the first, was for a manor house. This was the hall in which justice was dispensed, and so in time the house itself became known as the hall. The large residence in many English villages is consequently known as the hall. The use of the word for the entrance to a suburban house was a piece of Victorian gentility. Notable halls, using the word for a room, are Westminster Hall, the hall of Christ Church, Oxford, those of several London livery companies, and the banquetting hall, Whitehall.

**Hall** or **SCHWÄBISCH-HALL**. A town of Germany, in Württemberg. It lies in the deep valley of the Kocher on both banks of the river, 35 m. N.E. of Stuttgart, and still retains an old-world appearance. There are two important churches, S. Catharine and S. Michael, both 15th century Gothic, the latter having replaced a Romanesque building. The rococo town hall is a remarkable building of the period. The fountain in the market place with sculptures dates from 1509. Salt-works are important, and there are saline baths on an island in the river. There are metal and textile industries. Mentioned first in 1037, Hall was a free city of the empire from the 13th century down to 1802, when it was taken over by Württemberg. The coins called Heller (Häller) were first struck at the mint here. To the S. of the town is the 11th century Benedictine abbey of Komburg. Pop. 11,235.

**Hall, Sir Alfred Daniel** (1864-1942). British agriculturist. Born at Rochdale, he was educated at Manchester grammar school and Balliol College, Oxford. In 1894, he founded Wye College as a training school for agricultural specialists and in 1902 transferred to Rothamsted as director. A member of the development commission, from 1909, he became its permanent adviser in 1912, and organized a system of agricultural education. Hall was knighted in 1918. His publications included *The Rothamsted Experiment*; *A Pilgrimage of British Farming*; and with W. B. Crane he produced

a standard work on the apple. He died July 4, 1942.

**Hall, Asaph** (1829-1907). An American astronomer, of humble birth, Oct. 15, 1829. In 1857 he obtained a position in the Cambridge observatory, and after five years was professor of mathematics in the U.S. naval observatory. He was sent on expeditions to Bering Straits, Sicily, Vladivostok, and elsewhere to observe eclipses and transits, and in 1877 made his name by the discovery of the two satellites of Mars. Retiring from the observatory in 1891, he was professor of astronomy at Harvard, 1895-1901. He died Nov. 22, 1907.

**Hall, Charles Francis** (1821-71). American explorer. Born at Rochester, New Hampshire, he



*Charles Francis Hall*

began his career as a journalist, and, in the service of the American Geographical Society, in 1860 accompanied the expedition sent to search for Sir John Franklin, and passed two years amongst the Eskimos. In 1864 he made another Arctic voyage, meeting in 1866 some Eskimos who gave him authentic details of the fate of Franklin and his party. From them he received Franklin's watch and other relics which put the fate of the explorer beyond all doubt. On this occasion he spent five years in the Arctic regions. In 1871 he was sent on another expedition by the U.S. government, and reached 82° 11' N., the farthest north any vessel had yet attained. After a sledging expedition he was taken ill and died, Nov. 8, 1871. After many dangers his party returned to New York in 1873.

**Hall, Charles Martin** (1863-1914). American chemist. He was born in Ohio, Dec. 6, 1863, and educated at Oberlin College. He patented a method of preparing aluminium by dissolving alumina in a fused bath composed of the fluorides of aluminium and a metal more electro-positive than aluminium. By this invention aluminium became available at a cheap price. He died Dec. 27, 1914.

**Hall, Christopher Newman** (1816-1902). A British Nonconformist. Born at Maidstone, May 22, 1816, son of John Vine Hall (1774-1860), proprietor of The

Maidstone Journal and author of *The Sinner's Friend*, he was educated at Rochester and Totteridge. At the age of 14 he entered his father's printing office, becoming compositor, reader, and reporter. Then came conversion, lay preaching, and study for the ministry. He studied at Highbury College, and London University, 1837-42; was pastor of Albion Congregational Church, Hull, 1842-54; of Surrey Chapel, London, 1854-76; and of the same congregation at Christ Church, Lambeth, built at cost of £64,000 in perpetuation of Surrey Chapel, 1876-92.

He was chairman of the Congregational Union, 1866, laboured incessantly as an evangelical preacher, visited Canada and the U.S.A. in 1867, was an eloquent vindicator of the North during the American Civil War, and wrote many devotional works. Of his tract, *Come to Jesus*, 1848, translated into various languages, 4,000,000 copies were sold. He died Feb. 17, 1902.

**Hall, Edward** (c. 1500-1547). English chronicler. A Shropshire man, he was educated at Eton and King's College, Cambridge. He became a barrister and M.P. for Bridgnorth in 1542, while he also held official positions in the city of London. Hall is known solely as the author of a Chronicle published in 1548. This, called in full *The Union of the noble and illustrious families of Lancaster and York*, gives an account of the history of England from 1399 to 1547, when Henry VIII died. It is a valuable source, while it is also interesting because of Shakespeare's debt to it. Hall was a Protestant, a royalist, a hater of priests, and a lover of pageants. His Chronicle was continued by other hands; the part dealing with Hall's own lifetime was edited by C. Whibley, 1904.

**Hall, Joseph** (1574-1656). English prelate and author. Born at Bristow Park, Ashby-de-la-Zouch,



Joseph Hall,  
English prelate  
From a picture in Emmanuel Coll., Camb.

July 1, 1574, and educated at Emmanuel College, Cambridge, of which he became fellow, he held livings at Halstead and Waltham, was dean of Worcester, 1616, bishop of Exeter, 1627-41, and bishop of Norwich, 1641-47. He accompanied Sir Edmund Bacon to Spa, 1605; was chaplain to Henry



prince of Wales, 1608; and was deputy at the synod of Dort, 1618.

Though devoted to the Church of England, he was accused by Laud of puritanical leanings, and his defence of episcopacy, 1640, caused an attack by five Puritans whose initials formed the joint pseudonym of Smectymnuus, and involved him in controversy with Milton. Impeached and imprisoned 1642, his estate was sequestered and his house plundered. He described his trials in *Hard Measure*. 1647. He died in poverty at Higham, near Norwich, Sept. 8, 1656.

He wrote in couplets a series of epigrammatical satires, after the manner of Martial and Juvenal, entitled *Virgidemiarum* (gathering of rods), 1597-98. The first of their kind in English, they attacked current poetical taste, neglect of polite learning, and contemporary manners and fashions. Felicitous in phrasing, racy in their wit and humour, and intrepid in invective, they over-emphasised human frailty, but are valuable for their portraiture of men and manners of the time. Author of devotional works generally known as his *Contemplations*, Hall anticipated Earle and Overbury in the writing of *Characters*. Wotton calls him *Our English Seneca*. See *Works*, ed. P. Wynter, 1863; *Poems*, ed. A. B. Grosart, 1879; *Meditations*, ed. C. Sayle, 1902; *Life*, G. Lewis, 1886.

**Hall, MARGARET RADCLYFFE** (d. 1943). A British novelist. Born at Bournemouth, she was educated at London university and in Germany. Her verses were set to music by Coleridge-Taylor and other composers, her most popular ballad, *The Blind Ploughman*, by Coningsby Clarke. A novel, *The Unlit Lamp*, was published in 1924. *Adam's Breed*, in 1926, was awarded the *Femina Vie Heureuse* and *Tait Black* prizes. Two years later *The Well of Loneliness*, which dealt with lesbianism, aroused controversy; it was not allowed to circulate in Great Britain and was suppressed in the U.S.A., though later vindicated in the courts of law. Radclyffe Hall also wrote *The Master of the House*, 1932; *The Sixth Beatitude*, 1936. She died Oct. 7, 1943.

**Hall, MARIE** (1884-1956). British violinist. Born at Newcastle-upon-Tyne, April 8, 1884, she was the daughter of a harpist, and as a child showed exceptional gifts as a violinist. After studying with Elgar in England she went to

Sevcik, at Prague, under whom she developed wonderful technique. Returning to England in 1903, she took her place in the front rank of violinists, and made tours in almost all parts of the world. She gave the first performance of *The Lark Ascending* (Vaughan Williams). She married Edward Baring, 1911, and died at Cheltenham, Nov. 11, 1956.

**Hall, OLIVER** (b. 1869). A British painter, born in London. He became a landscape painter in the traditional style, with clear colours, exhibiting regularly at Burlington House. He was elected R.A. in 1927, and is represented at the Tate Gallery by pictures of *Shap Moors* and *Avignon*. Many of his works were purchased for provincial and foreign galleries.

**Hall, ROBERT** (1764-1831). A British Baptist preacher. Born at Arnesby, Leics, May 2, 1764, son of a Baptist pastor, he was educated at Bristol and King's College, Aberdeen. He was pastor at Cambridge, 1791-1806, and after periods of mental failure, held a ministry at Harvey Lane, Leicester, 1807-25. He died at Bristol, Feb. 21, 1831. A Calvinist after the type of Andrew Fuller, though opposed to him on the subject of communion, and an ardent supporter of missions, Hall gave sermons which remain among the classics of the modern pulpit. He was the author of *Christianity Consistent with a Love of Freedom*, 1791; *Apology for the Freedom of the Press*, 1793; *The Advantage of Knowledge to the Lower Classes*, 1810. His *Works* were edited by O. Gregory, 11th ed. 1853.

*After J. Flowers*

**Hall, SAMUEL CARTER** (1800-89). A British author and editor. He was born at Geneva barracks, Waterford, May 9, 1800. He came to London in 1822, was called to the bar at the Inner Temple, was gallery reporter for *The New Times*, and established and edited *The Amulet Annual*, 1826-37. He edited *The New Monthly*, 1830-36; founded and edited *The Art Journal*, 1839-80; wrote, with his wife Anna Maria, née Fielding (1800-81), Ireland, *Its Scenery, Character, etc.*, 1841-43; and was the author of *Memories of Great Men and Women*, 1871, and *Retrospect of a*

*Long Life*, 1883. He died March 16, 1889.

Mrs. S. C. Hall, who died Jan. 30, 1881, wrote sketches and stories of the Irish peasantry.

**Hall, SIR WILLIAM REGINALD** (1870-1943). British sailor, born June 28, 1870. He entered the Britannia in 1883, was appointed inspecting captain of mechanical training establishments, 1905, and was naval assistant to the controller of the navy, 1911-13. As commander of the battle cruiser *Queen Mary*, he introduced modern disciplinary methods and the three-watch system afterwards adopted throughout the service. During the First Great War he was director of intelligence of the war staff at the Admiralty. He was knighted in 1918 and promoted admiral in 1926. As Conservative M.P. he represented West Derby, 1919-23, was chief party agent, 1923, and sat for Eastbourne, 1925-29. He died Oct. 22, 1943.

**Hallam, ARTHUR HENRY** (1811-33). A British essayist. Born in London, Feb. 1, 1811, the eldest



Arthur Henry Hallam  
*From a bust by Chantrey*

son of Henry Hallam, the historian, he was educated at Eton and Trinity College, Cambridge, where he became intimate with Tennyson. His early death at Vienna, Sept. 15, 1833, which inspired Tennyson's elegiac poem, *In Memoriam*, cut short a career of remarkable promise. See *In Memoriam*; Tennyson, 1st Baron.

**Hallam, HENRY**, (1777-1859). A British historian. The son of John Hallam, dean of Bristol, he was born at Windsor,

July 9, 1777, and educated at Eton and Christ Church, Oxford. He became a barrister, but his private income, together with an easy post in the civil service, enabled him to devote his life to literary work. He died at Hayes, Kent, Jan. 21, 1859.

A strong Whig, Hallam wrote much for *The Edinburgh Review*. He is remembered chiefly by two monumental works. His *View of the State of Europe during the*



*Henry Hallam*

marks are used on imported wares. During 1697-1720 a higher standard of silver called the Britannia standard (95-84 per cent. silver) was compulsory; the marks prescribed for London were a lion's head erased and the figure of Britannia. The old sterling standard was restored in 1720, but the Britannia marks have occasionally been used since that date on articles of the higher standard.

There have been many statutes relating to hall-marking. In general all gold or silver wares are required by law to be hall-marked before they are offered for sale. Certain gold wares are exempted from compulsory hall-marking under an act of 1738. The Silver Wares Act, 1790, concerns exempted silver wares. Forgery or transposition of hall-marks is a felony.

For the purpose of hall-marking the manufacturer must send each article to the assay office before final polishing. Sample scrapings are taken from every part of the article and chemically assayed. If the assay is satisfactory the hall-mark is applied. *See Assaying; Goldsmiths' Company; consult also English Goldsmiths and their Marks*, Sir Charles Jackson, 2nd. ed., 1921; *Law & Practice of Hall-marking Gold and Silver Wares*, J. Paul de Castro, 2nd ed., 1935; *A Pocket Guide to Hall-marks*, F. Bradbury, 8th ed., 1950; *Hall-marks on Gold & Silver*, The Worshipful Company of Goldsmiths.

**Hall of Fame.** National shrine to perpetuate the memory of famous Americans. It stands on the campus of New York university overlooking Harlem, where it was erected in 1900 through a fund of \$250,000 contributed by Mrs. Finley J. Shepard. Its colonnade contains places for 150 bronze tablets surmounted by busts; these are given by associations or individual donors. Each panel records the name of a notable American, with an appropriate quotation. Names may be added every five years, and by 1945 the total had reached 77. No one may be commemorated who has not been dead at least 25 years. The quinquennial selection is made by about 100 persons representing literature, arts, education, science, law, and public services. A vote of 60 p.c. is necessary for selection of a name.

**Hallow-e'en.** Popular Scottish name for Oct. 31, the eve of All Saints' Day. Also called All-Hallows Eve, Holy Eve, Cake Night (in Yorkshire), and, in the N. of England, Nutcrack Night, from

early times it has been associated with many superstitions and customs, a number of which are referred to in Burns's poem of this name. Hallow-e'en is supposed to be a survival from the ancient festival of Pomona, the Roman goddess of fruit trees. Apples and nuts play a large part in the pastimes indulged in, the nuts being used for purposes of divination. There still lingers a belief that children born on Hallow-e'en possess supernatural gifts.

**Hall Peninsula.** Projection on the S.E. of Baffin Island, Canada, between Cumberland and Meta In-cognita peninsulas, divided from the latter by Frobisher Bay.

**Hall Process.** Process used in America for the preparation of pure alumina as a first stage in the production of aluminium. The impure ore, bauxite, is ground and sintered with coal dust. The sinter is then melted in an electric arc furnace with coke, and alumina is blown over from the top. Ferro-silicon and ferro-titanium may be tapped off as by-products. The product is not as pure as that obtained by the Bayer process and there is little economic gain. *See Aluminium.*

**Hallsands.** Village of Devon, England, 1½ m. from Start Point. The coast there is constantly being eroded by the sea, and in 1917 the greater part of the village was destroyed by a high tide, though many of the ruins remain. The village was rebuilt at a higher level. Hallsands has a good bathing beach. The hotel was built by its joint proprietresses, largely with their own hands, after their house had been destroyed by the sea. One of them, Ella Trout, was decorated in the First Great War when with her ten-year-old cousin she went in an open boat to the rescue of a ship torpedoed off Start Point.

**Hallstatt.** Village of Austria, in Upper Austria. It lies at the S. end of Hallstätter See, at a height of over 1,600 ft., 37 m. S.E. of Salzburg. It is famous for its salt mine. The church has a 15th century altar of carved wood, and there is a museum with Celtic and other antiquities. Pop. 800.

In the vicinity an important pre-historic cemetery was discovered in 1846. The numer-

ous burials included both cremations and inhumations and contained an enormous quantity of grave-goods which illustrate the transition from the Bronze Age to the Iron Age. The people tended cattle and practised agriculture; they also worked the salt mines and were therefore able to take part in the commerce of the region and to benefit from the trade along the Baltic-Adriatic amber route which passed about 40 m. to the east. The graves contained many amber beads and also numerous imports from Italy, including splendid bronze vessels. The knowledge of iron tools reached Upper Austria from the south about 1000 B.C., and as this region was rich in iron an important iron-mining industry gradually developed there. Hallstatt thus came to be one of the earliest communities north of the Alps to use and develop iron tools and weapons. Its name has been given to the first phase of the central European Iron Age, which is divided into Early Hallstatt (c. 850-600 B.C.), a period of gradual transition from the use of bronze to that of iron; and Late Hallstatt (600-400 B.C.), with the use of iron fully developed.

**Hallström, PER AUGUST LEONARD** (b. 1866). Swedish author born in Stockholm, Sept. 29, 1866. His first publication was a book of poems, 1891. Later he wrote novels and short stories of great charm, among them *Wild Birds*, 1894; *Purple*, 1895; *An Old Story*, 1895; *The Diamond Ornament*, 1896. He also wrote plays. A member of the Swedish academy from 1908, he was its secretary 1931-41. From 1922 he was president of the Nobel Prize literature committee. His style is somewhat involved, but he possessed rich imagination and insight into social problems.



Hallstatt, Austria. The village on the shore of the Hallstätter See

**Hallucination** (Lat. *hallucinari*, to wander in mind). Mental impression of sensory vividness which occurs without any external cause. It must be distinguished from an illusion, which is a similar impression based on misinterpretation of an external stimulus. Thus, seeing a ghost when nothing is there is hallucination; but mistaking a tombstone in the dusk for a ghost is an illusion.

Hallucinations may be physiogenic (due to drugs, tumours of the brain, disease toxins) or psychogenic, when they are projections of repressed material on to the external world. They may occur in any of the sensory fields (e.g. seeing visions, hearing voices). They are symptoms of schizophrenia and paranoia, and occur in delirium, under gas, etc. They are also, though rarely, met with in healthy people. In pseudo-hallucination the patient has the vivid sensory experience but is aware that it has no external foundation. See Apparition; Repression.

**Halluin.** Town of France. It stands on the Lys, 13 m. N. of Lille, in the dept. of Nord, being on the Belgian frontier. An old place, it was once the seat of a noted family. It has an interesting church. The chief industries are the manufacture of textiles, and there are also distilleries and iron-foundries. Pop. 12,935.

**Halma** (Gr., leap). Game played by two or four persons on a board divided into 256 squares, with men in the form of chess pawns. The men are placed in four spaces, termed yards, one at each corner of the board, and the object of the player is to get his own men into his adversary's yard, the player or side first accomplishing this winning the game. Moves are made by the step, a move of one square in any direction; and by the hop, any one piece may jump over any other piece of its own or any other colour in any direction, vertically, horizontally, or diagonally, and may continue so doing, provided there is a vacant square for it next to the piece hopped over. With two players, each has 19 men coloured black and white respectively. In the four-handed game, each player has 13 men only, the colours being white, black, red, and green. Sometimes four persons play in partnerships of two; or two players take two colours each.

**Halmahera** or **GILOLO**. Island of the Malay Archipelago, one of the Moluccas or Spice Islands. It consists of four peninsulas, two

in the N., one E., and one S. The Molucca passage separates it from Celebes in the W., and Pitt Passage divides it from Ceram on the S., while Gilolo Passage flows along the E. shores. The equator passes through the S. limb of the island. Mountainous and heavily forested, it has several active volcanoes, the chief of which are Tolo and Gama-kora. Its length from N. to S. is about 130 m., while maximum breadth in any of its peninsulas does not exceed 45 m.; its estimated area, including several small islands, is 6,900 sq. m.

The largest bays are Bolollo, Weda, Wossa, and Kiau. In the cultivated areas, spices, fruits, sago, coconuts, and edible birds' nests are produced. Horses, cattle, and sheep are reared, and precious gems are found. The principal towns are Gilolo, the capital Galela, and Patani. Subdivided into several petty states, the coastal districts are inhabited by Malays, while in the interior exists a race of inoffensive people called Alfuras. Up to the Second Great War Halmahera ranked as a colonial possession of the Netherlands. The Japanese after their invasion turned it into their chief base in the Moluccas. Pop. est. 140,322.

**Halmstad.** Seaport town of Sweden, capital of the govt. of Halland. It stands on the Kattegat, 76 m. S.S.E. of Gothenburg, with two harbours and a roadstead. An important junction, it has steamer communication with Copenhagen, Lübeck, and other ports. The 15th century castle is the residence of the provincial governor, and there are a 15th century church (restored) and a museum. Granite, timber, paper, fish, butter, oats, and potatoes from the S. of Sweden are exported. There are shipbuilding yards, cloth, flour, jute and saw mills, sugar refineries, and breweries. In the vicinity are mineral and sea-water baths. Here, in 1676, Charles XI defeated the Danes. Pop. 31,525.

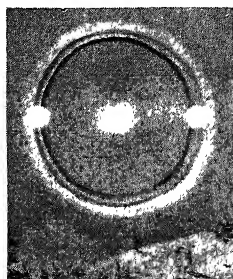
**Halo.** Luminous ring round the sun or moon. Halos, when clearly defined, are seen to be coloured red on the inside and blue on the outside, but the latter colour is always faint so that the ring may appear white on its outer edge.



Halo round the sun caused by ice crystals in high clouds

Usually about 22° in radius, a halo is due to the sun or moon being seen through a thin sheet of cirro stratus clouds, which owing to their elevation are composed of tiny ice crystals. It is the bending

or refraction of the light when passing through these ice crystals that causes the halo. A halo of 46° is occasionally visible but rarely complete. In polar regions, where ice crystals are usually present in the air, brilliant halos are common. Halos are features of warm fronts, but are too common (being visible one day in



Halo with mock suns on each rim of the circle, a phenomenon seen in 1924

three, in England) to be useful as weather signs. Mock suns are related phenomena. The word is derived from Gr. *halōs*, threshing-floor, space circular in form, round which the oxen trod.

**Halo** or **NIMBUS**. In art, a disk or circle of light surrounding the head in representations of divine personages and saints in sacred and legendary art. The nimbus of God the Father had the form of a single triangle, or of one triangle superposed on another, with divergent rays and, occasionally, the Greek letters  $\alpha$  (alpha) and  $\omega$  (omega) in the right and left lower corners of the superior triangle. The halo of the Saviour showed, within the circle, parts of the arms of a cross, the rest of which was concealed by the head. The Virgin's head was surrounded either by a plain circle, or by a circlet of stars, while the saint's halo was usually a circle of rays. A square nimbus indicated that the person so adorned was living when the painting was made. The halo is not unknown in sculpture, especially in Indian art. Among

the Hindus it took various shapes. For instance, the hair of the modelled image might be designed as streaming, halo-like, from each side of the head. See Saint.

**Hal of the Wynd.** Character in Scott's novel *The Fair Maid of Perth*. He is also called Henry Gow and the Gow Chrom (the bandy-legged smith). His name Hal or Henry of the Wynd, is applied to him because he lives in the Wynd of Perth. Known as the best armoured that ever made sword, and the truest soldier that ever drew one, his fear that Catharine Glover had been promised to Conachar (Eachin MacIain) makes Hal espouse the cause of Clan Chattan against Clan Quhele, in the famous battle of the North Inch. Four months after the battle Hal and Catharine are married.

**Halogens** (Gr. *hals*, salt; *gen-*, to produce). Name applied by Berzelius to a group of closely allied elements: fluorine, chlorine, bromine, and iodine. The salts of these elements are known as haloid salts. Each of the halogens is monatomic, and they exhibit well-marked gradation in their properties according to the atomic weights of the elements.

**Halophytes.** Plants whose natural habitat subjects them to the influence of salt water. In its restricted sense the term is applicable to such flowering plants as marsh samphire or glasswort (*Salicornia*) and cordgrass (*Spar-*



Halo as depicted by famous artists: 1. Fra Angelico, 1387-1455. 2. Botticelli, 1444-1510. 3. Raphael, 1483-1520. 4. Raphael, later pictures. 5. Doré and later pictures. 6. Raphael, the floating halo

25 p.c. chlorine. Many halophytes adapt themselves readily to alterations of salt concentration in mud. Thus they are fitted for colonising mud around bays and estuaries, where they may raise the level of the mud flat and make it salt pasture fit for reclamation.

**Haloragaceae.** Large family of herbs and shrubs. Mostly perennial, they are widely distributed throughout the world. Many of them are marsh or aquatic herbs, like water milfoil (*Myriophyllum*). The flowers are mostly minute, the sexes separate. The plants have no economic importance.

**Hals, FRANS** (c. 1580-1666). Dutch painter. He was born probably at Antwerp, the son of Pieter Hals Clarz. He may have studied under Adam van Noort at Antwerp, and afterwards with Van Mander at Haarlem. His first known work of importance is the group of the S. George's Shooting Guild of Haarlem, now in the town museum; it was painted in 1616, one of seven large pictures of contemporary guilds. The artist's extraordinary gift for seizing and expressing a fleeting human emotion is nowhere better shown than in the so-called Laughing Cavalier, in the Wallace collection. All his painting is direct, robust, and vital.

The National Gallery possesses five pictures by Hals, but the greatest works of his brush are in Dutch galleries, and it is often said that Hals cannot be appreciated without a visit to Haarlem, where

a museum devoted to his work has paintings representing all periods up to the last year of his life. The Rijks museum, Amsterdam, Glasgow Corporation gallery, and the Louvre have also good examples. For generations his work was held of small account; one of his portraits changed hands in 1786 for 5s.

Hals was twice married. His first wife died in 1615, the victim of his ill-treatment; the second, Lysbeth Reyniers, lived with him for nearly fifty years and bore him five sons, all of whom became artists. During his later years Hals lived on an allowance from the municipality of Haarlem, eked out by the proceeds from a teaching studio. See Descartes illus.; Dutch School.

**Halsbury, HARDINGE STANLEY GIFFARD, 1st EARL OF** (1823-1921). British lawyer. Born Sept. 3, 1823,



of a Devon family, he was educated at Merton College, Oxford. He became a barrister, having hereditary connexions with that profession, and after steady practice, especially in criminal cases, was made a Q.C. in 1865. In 1875, not yet having a seat in parliament,



Frans Hals Dutch painter, self-portrait  
Haarlem Museum

*tina*) which are unusual in thriving in salt marshes. Halophytes are often succulent with numbers of water-storing cells. They can absorb water from the solutions of high concentration which frequently surround their roots; this capacity is possibly due to the unusual degree in which their protoplasts are permeable to the chief solutes in sea water. In their ash may be found as much as 30 p.c. sodium and

he was made solicitor-general by Disraeli, and in 1877 entered the house of commons for Launceston. In 1885 he was created Baron Halsbury, and was made lord chancellor, an office he held throughout the Conservative ministries of 1886-92 and 1895-1905. In 1898 he was made earl of Halsbury and Viscount Tiverton.

Halsbury was remarkable for physical vigour. When over 80 he edited *The Encyclopaedia of the Laws of England*; when over 90 he sat as a judge in the lords. He vigorously resisted the Parliament Bill of 1911. Although not a profound lawyer, he was an able judge. He died Dec. 11, 1921. The 3rd earl, John (b. 1908), succeeded to the title in 1943.

**Halsey, Sir LIONEL** (1872-1949). British sailor. Born Feb. 26, 1872, he entered the navy in 1885. He served in the defence of Ladysmith as a lieutenant, was promoted captain 1905, and in 1912 was given command of H.M.S. *New Zealand*, which he led into action at Heligoland, Aug., 1914, and the Dogger Bank, Jan., 1915. He was on Jellicoe's staff at Jutland. In 1917 he became third sea lord and in 1918 was put in command of the Australian navy, and later created K.C.M.G. He was chief of staff to the prince of Wales during the prince's tours in Canada, the Antipodes, India, and Japan, and from 1920 was his comptroller and treasurer. Halsey, who retired from the navy 1922, was gazetted admiral 1926. He died Oct. 26, 1949.

**Halsey, WILLIAM FREDERICK** (b. 1882). American sailor. Born at Elizabeth, N.J., Oct. 30, 1882, he was educated at Virginia university and the Annapolis naval academy. Commissioned in 1905, he commanded a destroyer flotilla in the First Great War. Rear-admiral in 1938, he was given command of a carrier division. He led the attack against Japanese bases in the Marshall and Gilbert Islands in Jan., 1942, and on Oct. 24 replaced Admiral Gormley as commander in the S. Pacific. Halsey was thus responsible for the victories of the Solomon Islands and off Bougainville.

On June 15, 1944, Halsey was appointed commander of the U.S.

3rd fleet in the Pacific. He supported Gen. MacArthur's invasion of Leyte in Oct., defeating the Japanese navy in the battle for Leyte Gulf. On Jan. 9, 1945, his fleet assisted in the Luzon (q.v.) invasion and in the summer aircraft from his carriers attacked Kyushu and Honshu. The Japanese surrender terms were signed on his flagship *Missouri* in Tokyo Bay on Sept. 2.

**Halsingborg**. Alternative spelling of Helsingborg (q.v.).

**Halstead**. Urban district and market town of Essex, England. It stands on the Colne, 15 m. N.W. of Colchester, on the railway. The church of S. Andrew dates from the 14th century, and contains stone effigies of two unknown knights and brass effigies of members of the Bouchier family. Other buildings include the corn exchange and cottage hospital. Silk and crape are manufactured, and there are brass and iron foundries, breweries, and a tannery. The council owns the water-works and public baths, and maintains public gardens. Market day, Tues. Pop. (1951) 6,000. Another Halstead is near Knockholt in Kent.

**Haltemprice**. Urban dist. of the E. Riding of Yorkshire, England. Created in 1935 by the amalgamation of the urban dists. of Hessele and Cottingham with part of the rural dist. of Seulcoates, it extends from Hessele on the R. Humber on the S. to Dunswell on the N., and includes also Anlaty, Willerby, Kirk Ella, W. Ella, and Cottingham. Mainly residential, the district has some light industries, particularly market gardening (Dutch style) at Cottingham (from where Hull obtains its water supply) and Dunswell, shipbuilding, light engineering, whiting and cement making at Hessele. The townships within the urb. dist. (which gives its name to a co. constit. of the E.R.) are all ancient; records date back to c. 520 and include references in *Domesday Book*. Pop. (1951) 35,654.

**Halton**. Village of Bucks, England, 4 m. S.E. of Aylesbury. The principal school of technical training for what is now the R.A.F. has been here since 1917. Halton camp, which has an airfield adjoining, has room for about 1,500 aircraft apprentices.

**Haltwhistle**. Market town and parish of Northumberland, England. It stands on the S. Tyne, 16 m. W. of Hexham, on the Carlisle-Newcastle rly. line. A stretch of the Roman wall runs 2 m. N.,

and many antiquities have been found in the neighbourhood. The chief industry is coalmining, followed by quarrying and making paint and varnish. Market day, Thurs. Pop. (1951) parish, 3,745.

**Ham**. In anatomy, the back part of the leg behind the knee-joint, the five muscular tendons there being the hamstrings; secondarily, the thigh and buttock of any animal. The word is applied particularly to the thigh of a pig, salted, smoked, and cooked. The thigh is pickled in brine made of water, salt, saltpetre, and a little sugar, or simply rubbed with salt. When sufficiently salted it is hung for several days on an upper floor of a smoking house, the smouldering fire of wood or peat being on the lowest floor. It can be boiled, or baked in a crust of flour and water. Wiltshire and Yorkshire hams are the best.

**Ham**. Part of the bor. of Richmond, Surrey, England. A residential suburb of London, it stands between Twickenham, N., and Teddington, S., and is bounded on the E. by Richmond Park. The manor was given by Athelstan to his chief alderman, Wulgar, 931; and, after being in the possession of Francis, 1st Viscount Lovell, Anne of Cleves, Henry prince of Wales, and Charles I., was granted to John Maitland, 5th earl of Lauderdale, and his wife, Elizabeth, countess of Dysart.

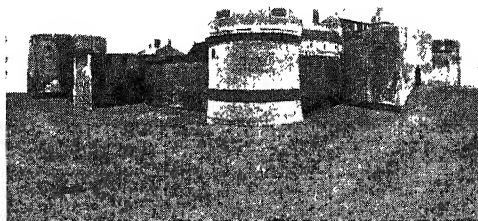
Facing the Thames, in the parish of Petersham, is Ham House, former seat of the earl of Dysart, built in 1610 on the site of the home of Wulgar by Sir Thomas Vavasour, given to the National Trust 1948, opened to the public 1950. It was the scene of the secret meetings of the Cabal (q.v.) and the birthplace of John Campbell, 2nd duke of Argyll. Notable for its 17th cent. furniture, it inspired the vision of the haunted house in Hood's poem, *The Elm Tree*. Ham Walks, extending from Ham House to Twickenham Ferry, are mentioned in Thomson's *The Seasons*, and were a favourite haunt of Swift, Pope, and Gay. Ham Common, 20 acres, is between Richmond Park and the road from Petersham to Kingston.

Ham is not to be confused with East Ham and West Ham in Essex. There was another Ham House in Portmore Park, Weybridge, which was given by James II to Catherine Sedley, who married the 1st earl of Portmore.

**Ham**. A town of France. It stands on the Somme, in the dept. of Somme, 36 m. E.S.E. of Amiens.



W. F. Halsey,  
American sailor



**Ham, France.** The castle from which Louis Napoleon escaped in 1846 after six years' confinement

It is famous for its castle, one of the most formidable of its kind. This was founded in the 10th century, but the present building dates mainly from the 13th century, with improvements of the 15th. A feature is the donjon, or constable's tower, one of enormous strength, having walls 35 ft. thick. This was long used as a prison, e.g. for Louis Napoleon.

The church of Notre Dame is the successor of an old building, most of which was burned in 1760. Erected to serve the abbey of S. Augustin, its 12th century crypt survives. The town has a library and a small museum. It figured in the First Great War battles of the Somme (q.v.). Pop. (1954) 3,598.

**Ham.** One of the sons of Noah (Gen. 9 and 10). He is said to have been the ancestor of the Ethiopians, Egyptians, and the nations of N. Africa generally. The name means hot or black, and is also the ancient name for Egypt, to which it is applied in Psalms 105 and 106.

**Hama.** A town of Syria, the Hamath of the Bible, and the ancient Epiphania. Situated on the Orontes among attractive gardens and groves of palms, 80 m. S. of Aleppo, it has a flourishing weaving industry and a fair amount of general trade, which is helped by its being on the Syrian rly. An early Amorite, and later Aramaean stronghold, it resisted assaults by successive Assyrian kings but was at length destroyed in 720 B.C. It was renamed Epiphania after Antiochus IV, converted to Islam A.D. 639, and captured by Tancred and Saladin. Five basalt slabs (taken to Istanbul) bear inscriptions in the "neo-Hittite" hieroglyphic script. Pop. (1954) 172,988.

**Hamadan.** City of Persia which long gave its name to a province. It is about 180 m. S.W. of Teheran, and is built on the site of the ancient Ecbatana. Long a place of importance as a centre of trade on the great road through Kermanshah to Khanikin and Bagdad, and

also with Teheran and the Caspian, it manufactures leather goods, carpets and silks. It contains the tomb of Avicenna, and, according to tradition, those of Esther and Mordecai. It was occupied in 1918 by British troops marching to the Caspian. Pop. 104,000.

**Hamadryad** (Gr. *hama*, together with; *drys*, tree). In Greek mythology, name given to nymphs who presided over trees. Their lives were co-existent with the lives of the trees in which they dwelt. See Nymphs.

**Hamadryad** OR KING COBRA. Large species of the cobra, found in India, Malaya, and the Philippines. It is extremely venomous and of fierce and rather aggressive disposition. In colour yellow or yellowish brown, with black bands, it attains a length of about 14 ft. As it feeds to a large extent on other snakes, it is in some degree a useful reptile.

Hamadryad is also the name of a baboon, *Papio hymandryas*.

**Hamamelis.** Botanical name (*H. virginica*) of witch hazel, an extract from whose leaves provides useful remedies for internal and external use. See Witch Hazel.

**Haman.** The chief minister and favourite of Ahasuerus, king of Persia. Because Mordecai, a Jew, paid him no reverence he resolved to destroy all Jews in the kingdom. Without mentioning Mordecai or the Jews he obtained from the king a decree requisite for his purpose. The plot, however, was exposed by Esther, cousin and adopted daughter of Mordecai, with the result that Haman was hanged on the gibbet he had prepared for Mordecai.

At the feast of Purim it became a custom among the Jews to hang Haman in effigy; and today when the Book of Esther is read in the synagogues the name of Ahasuerus' one-time favourite is received with contumely. The gallows is said to have been 50 cubits high, hence

the phrase to hang as high as Haman. See Esther; Mordecai.

**Hamar.** Town of Norway, in Hedmark co. It stands attractively between two bays of Lake Mjøsen, 78 m. by rly. N. of Oslo. The town dates from 1849 and is an episc. see. Locomotives and condensed milk are made and agricultural produce sold. Hamar was chosen as the seat of government and home of the royal family when the Germans invaded Norway, April 9, 1940. It was heavily bombed by aircraft and occupied by the invaders on April 20, after the king and government had gone to Elverum.

**Hamasa.** Word meaning brave and given to an anthology of Arabic poetry. This was collected by Abu Tammam in the 9th century and is divided into ten books. The first book deals with the heroes of the past, hence its name, and remaining ones with love, travel, and the like.

**Hamath.** Ancient city of Syria, the modern Hama (q.v.).

**Hambach.** Village of W. Germany in the Rhineland-Palatinate. It stands in the Hardt, 15 m. W. of Spire, in the centre of a vine-growing region. It is chiefly noted for its castle, where on May 27, 1832, the revolutionary movement in Bavaria was inaugurated by a meeting attended by 30,000 persons. This is also called the Maxburg and stands on a hill over 1,000 ft. high. Built by the emperor Henry II, the early building was destroyed by the French in 1688. Maximilian II of Bavaria replaced it in the 19th century by a residence.

**Hamble.** Village of Hampshire, England, at the mouth of the Hamble, 5½ m. S.E. of Southampton. It has lobster fisheries and an aerodrome, flying school, and aircraft works much developed during the Second Great War. The training ship Mercury (q.v.) lies here.

**Hambledon.** Village of Hampshire, England, famous for its cricket club. It is 6 m. N.E. of Fareham. Formed about 1750, the club was the first of its kind in England. The games were played on two downs, Windmill and Broad Halfpenny. The club was at the height of its fame in the 1780s, when David Harris and William Beldham played for it, and the Hambledon men were strong enough to encounter an all-England eleven. The village gives its name to the Hambledon Hunt. There is another Hambledon in Surrey, 3 m. from Godalming. See Cricket; Nyren.



**Hamadryad.** Head of the poisonous snake



**Hambourg, MARK** (b. 1879). Russian-born British pianist. Born at Bogutchar, May 30, 1879, he

first appeared on the concert platform at Moscow in 1888. He studied under Leschetizky at Vienna, and made his London debut in 1890. He established his reputation as a concerto player, but later devoted himself to recitals, touring Europe and the U.S.A., and being noted for the vigour of his style and for performance in the Liszt tradition. He pub. vols. of autobiography, *From Piano to Forte*, 1931; *The Eighth Octave*, 1951. His daughter Michal also became a concert pianist.



Mark Hambourg,  
British pianist

**Hamburg.** Second largest city and largest port of Germany. Standing 75 m. inland on the river Elbe, navigable for the biggest liners to this point, the area of the free state covered 158 sq. m., 52 being occupied by the city itself. The total of the built-up area, however, was much

larger, as the towns of Altona, Harburg-Wilhelmsburg, etc., within the adjoining Hanoverian area, and their parts of the port, formed an inseparable unit with Hamburg.

The river Alster, forming two connected lakes, the Inner and the Outer Alster, in the heart of the city, determines the picture of the town. Divided by the Lombard bridge and, at the inner end, flanked by the once-fashionable promenade of the Jungfernstieg, these lakes with their lively traffic in motor, steam, sailing, and rowing boats, and their many old canals running between huge, old warehouses built at the time of the Hanseatic League justified a comparison of Hamburg with Venice; while there was something of London in the habits, attire, and behaviour of the people, mainly Saxon in origin, seafaring, trading, and for centuries closely linked with England, whose language many of them spoke.

Before the Second Great War, the remnants of medieval Hamburg had, by several great fires, especially one of 1842, been reduced to S. James's (1392) and S. Catherine's (1426) churches

(both gutted by air attack in the Second Great War) and a number of old business houses along the "fleets" or canals. A number of buildings had, however, been reconstructed to their original pattern, e.g. Great S. Michael's (1750), S. Petri's (1849) and, S. Nicholas's, with its high tower, Hamburg's main landmark, rebuilt by Gilbert Scott, 1845-63.

Among the many outstanding secular buildings, the huge town hall, a modern Renaissance pile, with the adjoining exchange; the Johanneum with library and historical museum and several other public buildings were overshadowed by such 20th century buildings as the Chile House (1923), the Ballin House, the Sprinkenhof, the Mohlenhof, all characteristic of a proud merchant spirit. The university, founded in 1919, was remarkable for its library (705,000 volumes, 13,439 manuscripts, 929 incunabula)—lost as to two-thirds by aerial bombing in the Second Great War—and by the importance it attached to overseas studies and economics. Many other big libraries, museums, scientific societies (a mathematical society



Hamburg, Germany. 1. General view of the city in pre-war days. 2. British forces patrolling a street after the surrender, May 3, 1945. 3. Three U-boats which escaped destruction by Allied bombing. 4. Pre-war air view of Germany's largest port

Photos 2 and 3, British official, Crown copyright reserved

existing since 1690), famous hospitals, among them one for tropical diseases, observatory, meteorological institute, zoological and botanical gardens, an opera, two permanent theatres, and a number of famous orchestras, conservatoires and a musical academy testified to Hamburg's lively intellectual and artistic activities.

Shipping and commerce, however, were the backbone of its life. After New York and London the world's biggest port, receiving e.g. in 1932 18,024 vessels, and dispatching 20,087, Hamburg was the home port of 1,700 sea-going vessels with a tonnage of 1.5 million, as well as an inland fleet of 8,300 vessels with a tonnage of 1.2 million. The port area proper covered more than 6 sq. m. and held huge granaries, tanks, cranes, docks, shipyards, etc., the most famous of the latter that of Blohm & Voss. Along the many branchings of the port—the largest part of which was a free port for goods in transit or in store for later importation, such as coffee, oil-seed, rubber, tobacco, cocoa, tea, etc.—great industrial activity had developed. Flour and rice mills, cigar and tobacco factories, margarine, oil, asbestos, jute, rubber, saltpetre, phosphate, tanning and dressing, chemical and pharmaceutical, furniture and piano factories flourished, many of them working for export, and there were also multiple plants producing all shipping requisites. Hamburg had also become an important European air junction.

#### Hamburg in History

Hamburg's history started in 811 with the building of the Hammaburg by Charlemagne. It became an archbishopric in 834 and was closely connected, for a time, with the missionary work of Archbishop (Saint) Ansgar in the countries of Scandinavia, and later, in the 10th and 12th centuries, when the archbishopric had moved to Bremen, among the Slavonic tribes beyond the Elbe and Oder. Towards the end of the 12th century the new town was built, as a warehousing and trading centre, and in 1241 a treaty was made with Lübeck, for the reciprocal protection of their trade, and of their shipping in the Baltic and the North Sea respectively. This contributed towards the creation of the powerful Hanseatic League, as a member of which Hamburg fought pirates in the North Sea, and protected land routes from its own enlarged

territory. It was made a free city in 1510, though the kings of Denmark, in succession to counts of Holstein, claimed rights of suzerainty until 1768. Converted to the Protestant religion between 1522 and 1529, Hamburg granted asylum to refugee Lutherans, Calvinists, and Jews, and admitted English merchant adventurers in 1609, gaining, by this liberal attitude, the trade and importance as N. Europe's main trading centre, formerly held by Antwerp.

Spared by the Thirty Years' War, Hamburg fought successfully Danish, Brandenburg, and Hanoverian assailants in 1686, overcame home conflicts between aristocrats and democrats by imperial mediation, and benefited by the French revolution, once more as a centre of the emigration. Conquered by the French in 1806, cut off from Britain, annexed 1810 and fortified by Marshal Davout, it regained its liberty in 1814, and joined the Zollverein, with a separate free port, in 1838, after having placed its military protection in the hands of Prussia in 1868.

In the course of the 19th century, Hamburg suffered from political conflicts, mainly over its electoral laws; from a devastating fire in 1842, and a severe cholera epidemic in 1892; but it had steadily gained in wealth and size. Its pop., 107,000 in 1811, was 1,605,606 in 1950.

**SECOND GREAT WAR.** The almost total destruction of its port, and the destruction or severe damage of 42 p.c. of all the buildings of Hamburg, industrial and residential, by air attack in the Second Great War only temporarily affected the pre-war pop. figure. Most of the museums of Hamburg escaped with repairable damage, and the greater part of the city's art treasures, private and public, were saved by evacuation or by storage in the huge Flakturm and other air raid shelters.

Hamburg surrendered without direct attack to the British 2nd army on May 3, 1945, and was the headquarters of the British zone of occupation in Germany until the administrative amalgamation of the British and American zones in 1947. The great U-boat pens, which had taken four years to build with slave labour, were blown up by the R.E., Oct. 21, 1946. In Nov., 1947, Hamburg resumed its status (abolished by the Nazis) as a Hanseatic city.

HAMBURG STATE comprised the seaport of Cuxhaven, the garden-city of Bergedorf (about 20,000 pop. each), Geesthacht, with pop. 5,000, and 28 rural communities, including the Vierlande vegetable, fruit, flower, and beekeeping area, with total pop. 40,000.

**Hamburg-America Line** OR HAPAG. Anglicised and abbreviated forms of the German name of one of Germany's two biggest shipping lines. Founded 1847, it began to run steamships in 1855, and owned 36,000 tons of shipping in 1871, when the Reich was united by Prussia. It built the 50,000-ton steamers Imperator, Vaterland, and Bismarck before the First Great War, and owned 1,360,360 tons of shipping before it lost, under the treaty of Versailles, more than 90 p.c. of it. Reconstructed with state assistance, it had more than a million tons again by 1928; it was temporarily federated with its competitor, the Norddeutscher Lloyd, (q.v.) of Bremen in 1930, after having absorbed several smaller lines. During, and in consequence of, the Second Great War, it again lost all its liners and its big oversea branches. Albert Ballin, its directing genius 1888 to 1918, died by suicide when the First Great War was lost.

**Hamburger.** Kind of meat cake or rissole. Originally hamburgers consisted of lean beef, twice minced, flavoured with pepper, salt, and grated onion, formed into small round steaks of equal thickness, and broiled slowly (not fried). They were served with a little butter on each, and a dusting of salt, or with brown or tomato sauce. They became popular first in the U.S.A., where they were a standby of delicatessen stores. The name has come to be used for any round cake made of minced beef (or other meat) with herbs and sometimes potatoes.

**Hamel, GUSTAV** (1889-1914). A British aviator. Educated at Westminster, he took up aviation in its early days, and in 1911, after qualifying for his pilot's certificate at Pau (France), carried the first official air mail between Hendon and Windsor. In 1913, after winning the Aerial Derby around London, he became a leading exhibition pilot, early in 1914 looping the loop 14 times in 17 mins. at Windsor in the presence of King George V and Queen Mary. In May, 1914, he was lost in the Channel while returning in a new monoplane from Paris, no trace of him or his machine being found.

**Hameln.** Town of Germany, in the *Land* of N. Rhine-Westphalia. It is situated on the Weser, above the junction with the Hamel, which flows through the town, 25 m. S.W. of Hanover. Its fame is connected with the legend of the Rattenfänger or Ratcatcher, known to English readers through Browning's poem *The Pied Piper of Hamelin*. The story may have originated in the fact that most of the town's youth perished in a battle in 1259, and an outbreak of dancing mania in 1284.

There is fine Renaissance architecture in the town hall and other houses. A 14th century minster, dedicated to S. Boniface, was restored 1870-75. The industries include sugar refining, spinning, milling, and soap and paper making. A large river trade is carried on, and there are salmon fisheries. Hameln, a Saxon settlement, grew up round the old abbey of S. Boniface in the 8th century, and in 1259 belonged to the bishopric of Minden, passing in 1277 to Brunswick, after which it became a member of the Hanseatic League. It fell to the Swedes in 1633, and on two subsequent occasions, 1757 and 1806, to the French, finally becoming a Prussian town in 1866. Pop. 27,985.

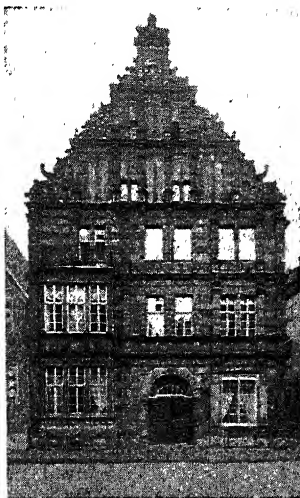
**Hamerling, ROBERT** (1830-89). Austrian poet. He was born at Kirchberg, Lower Austria, Mar. 24, 1830, and as a student at Vienna shared in the troubles of 1848-49. In 1855 he was appointed lecturer at Trieste. Owing to ill-health he retired on a pension in 1866 and lived an invalid's life at Graz, where he died July 13, 1889.



Robert Hamerling.  
Austrian poet

The most notable of his volumes were *Sinnen und Minnen* (*Meditations and Love*), 1860; *Das Schwanenlied der Romantik* (*The Swan Song of Romanticism*), 1862; *Ahasver in Rom* (*Ahasverus in Rome*), 1866; *Der König von Sion* (*The King of Sion*), 1869; *Amor und Psyche*, 1882; *Blätter im Winde* (*Leaves in the Wind*), 1887; *Homunculus*, 1888.

**Hamerton, PHILIP GILBERT** (1834-94). British art critic, born at Laneside, near Oldham, Sept. 10, 1834. He showed no remarkable talent for painting, but in search of landscapes he visited Scotland, and in *The Isles of Loch Awe*, 1855, made his first appear-



Hameln, Germany. The Ratcatcher's House, built in 1802, the reputed home of the legendary ratcatcher

ance as a poet. In 1857 he was back encamped at Loch Awe; the fascinating story of that and later encampments in the company of his French wife, as related in *A Painter's Camp in the Highlands*, 1862, caught the public fancy.

Hamerton became an accepted authority on art, and like Ruskin gave attention to social philosophy. *The Intellectual Life*, 1873, being one of the classics of the Victorian era. *Etching and Etchers*, 1868, and *The Graphic Arts*, 1885, stand



Philip Gilbert Hamerton,  
British critic  
Elliott & Fry

out beyond the mass of art criticism of his time. He died at Boulogne-sur-Seine, Nov. 6, 1894.

**Ham Hill** or **HAMDON**. Elevation in Somerset, England, 4 m. W. of Yeovil. Covering about 210 acres on the summit is an ancient British earthwork 3 m. in circumference, in a good state of preservation and yielding interesting traces of British and of Roman occupation. Valuable building stone is quarried on the hill.

**Ham House.** See under *Ham*.

**Hami.** A town in the N.E. of Sinkiang, China, on the road from Peking to Kashgar. Established on an oasis in the desert, Hami was captured from the Tartars in 1477. It is an important trading centre, and forms a meeting ground of the Buddhist and Muslim worlds. Pop. 46,200.

**Hamilcar.** Name of several famous Carthaginians. (1) Son of Mago, one of the suffetes or supreme magistrates. Having invaded Sicily 480 B.C. with a large army of mercenaries, he laid siege to Himera, but was utterly defeated by Gelo (*q.v.*). Hamilcar himself was slain and his army virtually annihilated. (2) Ambassador to Alexander after the fall of Tyre in 332 B.C.: he was later executed for betraying Carthaginian interests. (3) Military and naval commander during the first Punic War. After various successful operations by land, the Carthaginian fleet, commanded by Hamilcar and Hanno, was defeated (256 B.C.) by Regulus and Volso off Ecnomus.

**Hamilcar.** Transport glider designed by General Aircraft Ltd. for the R.A.F. in the Second Great War. It first went into operational service at the invasion of Europe in June, 1944, when its ability to transport a Bren gun carrier or light tank or equivalent load up to 8 tons proved of immediate value. A large craft (wing span 110 ft.), it needed a heavy bomber or transport plane as its tug. See *Glider*.

**Hamilcar Barca** (c. 270-228 B.C.). Carthaginian soldier and statesman, the father of Hannibal. In command from 247 of Carthaginian forces in Sicily during the first Punic War, he held his ground against the Romans, until the naval victory of the latter under Catullus, in 241 B.C., forced the Carthaginians to conclude a peace, in negotiating which Hamilcar took the leading part. On his return to Carthage he had to deal with a revolt of mercen-

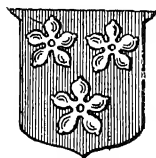


Hamilcar, Carthaginian soldier  
From a coin

aries, which he crushed after three years. He then turned his attention to Spain, and in nine years, by fighting and by negotiation, had established Carthaginian dominion over a great part of the country, when his career was brought to an end by his death in battle in 228 B.C. His surname means lightning (*Heb. barak*).

**Hamilton.** Burgh of Lanarkshire, Scotland, 11 m. S. of Glasgow, near to where the river Avon joins the river Clyde. It is the centre of co. administration and gives its name to a co. constituency. Hamilton was originally named Cadzow but about 1450 the town

took its present name when it passed to the Hamilton family. Created a royal burgh by Mary Queen of Scots in 1548. It later relinquished this status for a charter by Anne, duchess of Hamilton, to become a burgh of regality in 1670.



Hamilton arms

The town became a parliamentary burgh in 1832.

Most of Hamilton's historic buildings have been demolished because made unsafe by ground subsidence due to coalmining in and around the town during 1870-1947. Hamilton Palace, seat of the dukes of Hamilton, stood within the boundaries of the town; it was demolished during the 1920s. In the palace grounds is the Hamilton mausoleum with its wonderful echo. The ruins of the ancient castle of Cadzow stand in the Hamilton estates, in the park in which is kept a famous herd of white cattle. The first church at Cadzow was established in the 12th century, to become the collegiate church of Hamilton in 1452, which in turn was replaced in 1732 by a parish church designed by the elder Adam. Hamilton grammar school was founded in 1588; Hamilton academy building was opened in 1913. A branch rly. line connects Hamilton with the main Glasgow-Carlisle line. There are engineering, textile, and light industries. Pop. (1951) 40,174.

**Hamilton.** City and port of Ontario, Canada. It stands on a branch of Burlington Bay, at the W. end of Lake Ontario, 36 m. S.W. of Toronto. It is served by the C.P.R., C.N.R., and local electric trains. Steamers go to Toronto and other ports on the St. Lawrence and the great lakes. Behind are hills

and in front is the narrow strip of Burlington Beach, which, separating Hamilton from Burlington Bay, has been cut by a canal.

The city has Anglican and R.C. cathedrals and a number of churches. The seat of McMaster university, it has many colleges and schools, hospitals, public libraries, and theatres; also parks and recreation and athletic grounds, the chief parks being Gore and Dundurn Castle. There are the county buildings of Wentworth co., and a fine market square. Electric tramcars run through the wide streets, and electric light and power come from Niagara and De Cew Falls. Sometimes called the Birmingham of Canada, Hamilton has large blast furnaces, when constructed the largest in the British Commonwealth; and big canneries. The centre of the Canadian steel industry, it makes agricultural and textile machinery, also silk, cotton, and woollen goods.

The city was founded about 1778, its first inhabitants being loyalists from the U.S.A. Its growth during the early 20th century to the fifth city of Canada in 1956 was mainly due to the introduction of electric power. Pop. (1956) 239,625.

**Hamilton.** Town of Victoria, Australia. It lies on the Wannon river in Dundas and Normanby counties, 197 m. by rly. W. of Melbourne, at the point where the Great Dividing Range dies down to the plain of west Australia. It is a sheep-farming and agricultural centre; mutton is frozen and exported. The town has two colleges, and there is a racecourse. Pop. (1954) 8,508.



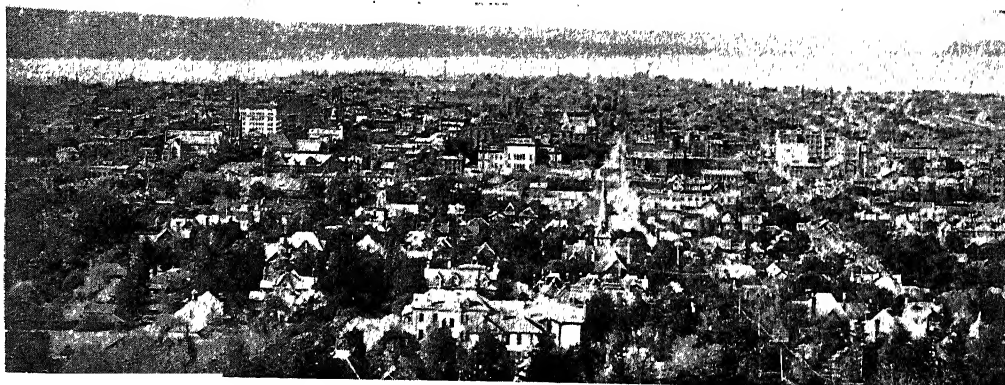
Hamilton, Ontario, arms

**Hamilton.** A town of North Island, New Zealand, in Waipa co. It is 86 m. by rly. S.S.E. of Auckland, the centre of a grazing and dairying district and an important rly. junction. It was first laid out for settlement by British soldiers after the Maori Wars. Pop. (1951) 29,839.

**Hamilton.** Chief town and administrative centre of the Bermudas. It is situated on Great Bermuda or Main Island, with a deep harbour approached by a long, intricate channel through Two Rock Passage. There are well-laid-out gardens, and it is a winter resort for American visitors. Pop. 2,800.

**Hamilton.** City of Ohio, U.S.A., the county seat of Butler co. It stands on the Great Miami river 25 m. N. of Cincinnati, and is served by the Pennsylvania, Erie, and Baltimore and Ohio rlys., having also an airport. Its industries include the manufacture of bank vaults and safes, machine tools and machinery of many kinds, coated paper, and woollen goods and felt. It is at the centre of a farming and stock-raising area, and has several business colleges. Settled in 1791. Hamilton was given its charter as a city in 1857. Pop. (1950) 57,951.

**Hamilton.** Famous Scottish family to which the dukes of Abercorn and Hamilton belong. All branches appear to have descended from Walter Fitzgilbert (13th century) and one story is that the name is taken from a place in Leicestershire. Walter called himself of Hameldone and obtained the barony of Cadzow in Lanarkshire. His younger son was the ancestor of the earl of Haddington, one of the many titles held by the Hamiltons. Walter's eldest son David, who held the barony of Cadzow, was taken prisoner at Neville's Cross, 1346, and was a



Hamilton, Canada. General view of the city on Lake Ontario

lord of parliament. From him various branches of the Hamiltons descended, one being now represented by Lord Hamilton of Dalzell.

James Hamilton, baron of Cadzow who was made Lord Hamilton in 1445, founded the family's greatness by his marriage with Mary, daughter of James II. His son was made earl of Arran in 1503, and one of his illegitimate children was John Hamilton, archbishop of St. Andrews, hanged in 1571. The 2nd earl of Arran was the father of Claud, Lord Paisley, from whom the dukes of Abercorn are descended, and of John, made marquess of Hamilton. From the latter the dukes of Hamilton are descended, though, after the death of the 2nd duke in 1651, only in the female line. The heir male of the family is therefore the duke of Abercorn, whose eldest son is known as the marquess of Hamilton. In 1786 the earl of Abercorn was created Viscount Hamilton of Hamilton in Leicestershire. A history of the house, by G. Hamilton, appeared in 1934.

**Hamilton, DUKE OF.** Scottish title, the oldest of its kind in the peerage, borne by the families of Hamilton and Douglas-Hamilton since 1643. The younger son of the 2nd earl of Arran (*q.v.*) was created marquess of Hamilton in 1599. In 1604 he was succeeded by his son James, who, in 1619, was made an English peer as earl of Cambridge. The latter's son James was the first duke (*v.i.*), created in 1643. Executed in 1649 for his share in the civil war, he was followed in the title by his brother William, earl of Lanark, secretary of state in Scotland under Charles I. William having been mortally wounded at Worcester in 1651, the title and estates passed to his niece Anne. She married William Douglas, earl of Selkirk, who, in 1660, was created duke of Hamilton. This duke, who ranks as the 3rd, supported William of Orange in 1688 and died in 1694.

The duchess survived him, but in 1698 she resigned her titles to her son James Douglas, who was created duke with precedence from 1643. He was made duke of Brandon in 1711, and was killed in a famous duel with Lord Mohun in 1712, an incident depicted in Thackeray's *Esmond*. From him the later dukes are descended. James, the 6th, married the beauty, Elizabeth Gunning (*q.v.*); James, the 7th, inherited in 1761 the title of marquess of Douglas; he failed after litigation to secure



William, 3rd Duke of Hamilton  
After Mylens

the Douglas estates, but the family was known thenceforward as Douglas-Hamilton. Alexander, 10th duke, ambassador at St. Petersburg, was a great collector of works of art. William, 12th duke, was made duke of Châtelleraut in 1864 by Napoleon III.

The semi-royal position of the dukes of Hamilton passed with the death of the 12th duke in 1895. He was succeeded by a cousin, Alfred Douglas, but left many of his estates to his daughter, who became duchess of Montrose. The 14th duke is separately noticed. The estates are at Dungavel, Lanarkshire, and the eldest son is known as marquess of Douglas and Clydesdale.

**Hamilton, JAMES HAMILTON, 1ST DUKE OF (1606-49).** Scottish politician. The eldest son of the 2nd marquess of Hamilton, he was born June 19, 1606. For a time he was at Exeter College, Oxford, and, having become marquess in 1625, he went to the court of Charles I.



1st Duke of Hamilton,  
Scottish politician  
After Van Dyck

He spent 1631-34 in Germany, whither he took a force to aid Gustavus Adolphus, but returned to advise Charles, and was made commissioner for Scotland in 1638. Always an intriguer, in 1641 he deserted Charles, but soon was serving him again.

When the Civil War broke out Hamilton remained in Scotland, being leader of a faction there. He was raised to a dukedom in 1643, but his plans and intrigues failed, and, discredited, he left

Edinburgh for Oxford. Charles put him in prison, but soon he was released. Then came the crowning act of his life, his leadership of a strong Scottish force to restore Charles, which led to the renewal of the civil war in 1648. Incompetent as a general, he was easily routed at Preston, and was made prisoner. On March 9, 1649, he was executed.

**Hamilton, DOUGLAS DOUGLAS-HAMILTON, 14TH DUKE OF (b. 1903).** Scottish politician and airman. Eldest son of the 13th duke (whom he succeeded in 1940), he was born Feb. 3, 1903, and educated at Eton and Balliol College, Oxford. As marquess of Douglas and Clydesdale he became well known as a boxer and explorer, accompanying as pilot the Mt. Everest expedition in 1933 and flying over the peak. He represented E. Renfrewshire as Conservative M.P., 1930-40. In 1937 he married Lady Elizabeth Percy, daughter of the duke of Northumberland, and in 1940 was appointed lord steward of the royal household. Hess (*q.v.*), Nazi leader, after his sensational flight to Scotland in 1941, declared that he had wished to land on the estate of the duke, whom he claimed to have known in Germany before the Second Great War.

The duke's brother, Lord David Douglas-Hamilton (1912-44), a noted boxer, married Ann Prunella Stack, director of the Women's League of Health and Beauty.

**Hamilton, ALEXANDER (1757-1804).** American statesman. He was born Jan. 11, 1757, on the island of Nevis,

West Indies, of which his mother was a native; his father was a Scotsman. Educated at King's (later Columbia) College, New York, at the age of 17 he published essays on *The Rights of the Colonies*. At 20 he was a lieutenant-colonel and aide-de-camp to Washington, and he led a column against Yorktown. In 1780 he married a daughter of Gen. Schuyler, who survived him 50 years.

In 1782 he was elected a member of congress for the state of New York, in 1786 became a member of the State legislature, and in 1787 he was a delegate to the Philadelphia convention for framing the con-



A Hamilton  
After Trumbull



stitution of the U.S.A., with the drafting of which he had much to do. In 1789 at the New York convention he secured ratification of the federal constitution. With two friends, he had produced *The Federalist*, explaining the constitution to the people.

During 1789-95 he was secretary to the Treasury, when he established the national bank and proved himself a great financier. After resigning he practised law in New York but remained a powerful political figure, embarrassing President Adams. In 1798 he was appointed second in command of the provisional army in anticipation of a French invasion, and on the death of Washington, 1799, was in chief command. Hamilton incurred the enmity of Aaron Burr, who blamed him for the election of Jefferson as president, and on July 11, 1804, he was wounded in a duel with Burr, and died the following day. Washington's closest associate, Hamilton was a great and clear thinker, whose influence on the political development of his country was enormous, though he did not subscribe to Jefferson's faith in the good judgement of the common man. He was portrayed in a film by George Arliss, 1932.

**Hamilton, ANTHONY, COUNT** (c. 1646-1720). British author and soldier. Son of Sir George Hamilton, a younger son of the duke of Abercorn, he is believed to have been born at Roscrea, Tipperary. He took part in the fighting in Ireland, 1689-90, and was at the battle of the Boyne, after which he went abroad and spent most of his life at the court of the Stuarts in exile at St. Germain-en-Laye, where he died, April 21, 1720. He is chiefly remembered as writer of the lively *Memoirs of his brother-in-law, the count of Gramont* (q.v.), dealing with the court of Charles II.

**Hamilton, (ANTHONY WALTER) PATRICK** (b. 1904). British dramatist. Born at Hassocks, Sussex, March 17, 1904, he was educated at Westminster. He made his reputation with the psychological thriller *Rope*, produced at the Ambassadors Theatre, London, 1929, and again scored a great success with *Gas Light*, at the Apollo Theatre, 1938. Two films were based on this play, the first in 1940, the second (*The Murder in Thornton Square*) in 1944. The *Duke in Darkness* was produced at the St. James's Theatre, 1942. A novel, *Hangover Square*, 1941, was made into a film, 1945. He pub. an autobiography in 1948.

**Hamilton, CICELY.** Pseudonym of Cicely Mary Hammill (1872-1952), British actress and writer.

Born in London, educated at Malvern and in Germany, she was teacher, journalist, and actress on tour before her successful comedy *Diana of Dobson's* was produced in 1908 at Wyndham's, London. None of her many later plays was so successful. She created the part of Mrs. Knox in Bernard Shaw's *Fanny's First Play*, 1911. Her

novel *William—an Englishman*, 1919, won the *Femina-Vie Heureuse* prize. She pub. *Life Errant* (autobiography), 1935. In her youth a leading feminist, she died Dec. 5, 1952.

**Hamilton, COSMO** (1872-1942). British novelist and dramatist. Elder brother of Sir Philip Gibbs (q.v.), he adopted his mother's surname. He wrote over 40 plays and some 30 novels. He collaborated with Seymour Hicks in *The Catch of the Season*, 1904, and *The Beauty of Bath*, 1906. Later plays included *The Aunt of England* (with Anthony Gibbs), 1935. His novels began with *Adam's Clay*, 1907, followed by many best sellers, e.g. *The Rustle of Silk*, 1922; *Every Man to His Wife*, 1938. *Discord and Harmony*, 1938, was on the collaboration of Gilbert and Sullivan. He died Oct. 14, 1942.

**Hamilton, SIR EDWARD** (1772-1851). British sailor. Born March 12, 1772, when a boy he served for two years with his father, Sir John Hamilton, in the W. Indies. Promoted lieutenant in 1793, he was present at the siege of Bastia, 1794, and in 1796 was sent again to the West Indies. In 1799 he led a party in boats into the harbour of Puerto Cabello and, under heavy fire, seized the Spanish frigate *Hermione*, and towed her out. Only 12 of his men were wounded, but Hamilton himself was badly hit. This unrivalled feat won him a knighthood and the naval gold medal. While returning to England he was captured by a French privateer and taken to Paris, where Napoleon is said to have questioned him about his exploit. In 1818 he was created a baronet and became an admiral in 1846. He died in London, March 21, 1851.

**Hamilton, EMMA, LADY** (c. 1763-1815). British adventuress.

A daughter of one Henry Lyon, she was baptized at Groat Neston, Cheshire, in 1765, being named Amy. April 26, 1763, is sometimes given as her birth date. Her parents were in humble circumstances, and her father having died while she was a baby, she was brought up by her grandmother at Hawarden. She came to London about 1778 as a nursemaid, and there



Emma, Lady Hamilton  
After Romney, the original belonging to Mr. Frock of Philadelphia

many conflicting stories as to her early life and intrigues. In 1782 she became the mistress of the Hon. Charles Greville, and four years later of his uncle, Sir William Hamilton, British ambassador at Naples. In 1791 Sir William married her at Marylebone, and returned with her to Naples, where she became the confidante of the queen. In 1793 she and Nelson first met, but it was five years later, after his victory at the Nile, that they became intimate. Their child, Horatia, was born in 1801, after the return of the Hamiltons and Nelson to England. Hamilton died in 1803, and Nelson in 1805. Lady Hamilton was left with comfortable means, soon swallowed up by her extravagance.

After being imprisoned for debt, she went to Calais, in 1813, and died there Jan. 15, 1815. She made extravagant claims to public reward on account of alleged services rendered to the state, and is remembered mainly for her *liaison* with Nelson and for her remarkable beauty, to which over twenty portraits by Romney bear witness. Her memoirs went into several editions. Consult *Lady Hamilton* and *Nelson*, J. C. Jeaffreson, 1888; *Lives*, H. Gamlin, 1891; *W. Sichel*, 1905; *O. A. Sherrard*, 1927. A film about Lady Hamilton starred Vivien Leigh, 1941.

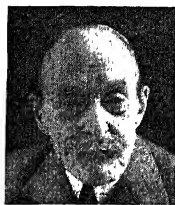
**Hamilton, LORD GEORGE FRANCIS** (1845-1927). British politician. Younger son of the 1st duke of Abercorn, he was born Dec. 17, 1845, and went to Harrow. In 1868 he was sent to the house of commons for Middlesex, and after the re-distribution of 1885 represented the Ealing division until his retirement. In 1874 he entered the Conservative ministry as under-



secretary for India, and in 1878 was transferred to the office of vice-president of the council. During 1885-86 and 1886-92, he was first lord of the Admiralty, and was secretary for India 1895-1903.

He resigned in 1903 owing to disagreement with Chamberlain's fiscal proposals, and did not seek re-election in 1906. In 1894 he was chairman of the London County Council. He was chairman of a commission that inquired into the poor laws, 1904-09, and of one that reported upon the early failure in Mesopotamia during the First Great War. In 1922 Lord George published his autobiography. He died Sept. 22, 1927.

**Hamilton, Sir Ian Standish Monteith** (1853-1947). British soldier. The son of a soldier, he



Sir Ian Hamilton,  
British soldier

was born at Corfu, Jan. 16, 1853. Educated at Cheam School and Wellington College, he entered the Gordon Highlanders in 1873, and first saw active service in the Afghan War of 1878-79. In the Boer War of 1881 he was wounded and taken prisoner at Majuba Hill. He was with the expedition up the Nile in 1884-85, and in Burma, 1886-87. In 1891 he became colonel, and, after service in the Chitral campaign, 1895, led a brigade in the Tirah, 1897-98. For a short time he commanded the school of musketry at Hythe.

In 1899, when the S. African War began, Hamilton was in Ladysmith as chief of staff to Sir George White, and he was in command of the infantry at Elands-laagte and other engagements. After the relief of Ladysmith he commanded some mounted infantry, was chief of staff to Lord Kitchener, and was in command of mobile columns in the Transvaal until the end of the war in 1902, when he became quartermaster-general to the forces. He was made K.C.B. in 1900.

During the Russo-Japanese War he was military representative of India, being in Manchuria with the Japanese, an experience which led to his book, *A Staff Officer's Scrap Book*. From 1910 he was commander-in-chief in the Mediterranean and inspector-general of overseas forces. In 1915, having been made full general, Hamilton was chosen to command the force that landed on the Gallipoli peninsula. He led

it until he was superseded in Oct. The failure of the expedition was bound to react on the general in charge of operations, and the commission that inquired into the matter censured him, although on only minor points. He retired from the army in 1920 in which year his Gallipoli Diary was published. He showed distinct gifts of style in his dispatches, and was something of a poet. He wrote *When I Was a Boy*, 1939; *Listening for the Drums*, 1944; and several other books. After his retirement he interested himself in the work of the British Legion. During 1932-35 he was rector of Edinburgh University. He died Oct. 12, 1947.

**Hamilton, Janet** (1795-1873). British poet. She was born at Carshill, Lanarkshire, on October 12, 1795, the daughter of a shoemaker named Thomson. She married one of his employees in 1809. Though she never went more than 20 miles from her birthplace, and was blind for 18 years before her death on Oct. 27, 1873, she published verses—e.g. *Poems and Songs*, 1863; *Ballads*, 1868—which have a permanent place in Scottish literature.

**Hamilton, Mary Agnes** (b. 1884). A British politician and writer. Born July 8, 1884, a



Mary Agnes  
Hamilton, British  
politician and writer

daughter of Robert Adamson, professor of Logic at Glasgow University, she was educated at Glasgow high school and Newnham College, Cambridge. She represented Blackburn as Labour M.P.; 1929-31, being at the same time a member of the royal commission on the civil service. A governor of the B.B.C., 1933-37, she was later a frequent member of its "brains trust." Her publications included novels—*Less than the Dust*, *Dead Yesterday*, *Full Circle*, *Follow my Leader*, and others—and a detective story, *Murder in the House of Commons*, 1931; a history of Newnham, 1936; biographies of Margaret Bondfield, Ramsay MacDonald, Sidney and Beatrice Webb, Arthur Henderson, and others; and memoirs—*Remembering my Good Friends*, 1944; *Up Hill all the Way* (autobiography), 1953.

**Hamilton, Patrick** (c. 1504-28). Proto-martyr of the Scottish Reformation. Born at Stane

House, Lanarkshire, or Kincavel, West Lothian, he was grandson of the 1st Baron Hamilton and of Alexander Stewart, duke of Albany, second son of James II. Made abbot of Ferne, Ross-shire, in his 14th year, he was educated at Paris, Louvain, and St. Andrews.

For commending Tyndale's translation of the N.T. in 1526 he was charged with heresy. He escaped to Marburg, where he came under the influence of Luther and other reformers and composed his *Loci Communes*, known as *Patrick's Pleas*, in which he set forth the doctrine of justification by faith. He returned to Scotland in the autumn of 1527, was seized Feb. 28, 1528, tried for heresy in St. Andrews cathedral, sentenced by Archbishop Beaton, and burnt at the stake, Feb. 29. Consult *Patrick Hamilton*, a composite biography, ed. A. Cameron, 1930.

**Hamilton, Patrick**. British writer. See *Hamilton*, (Anthony Walter) or *Patrick*.

**Hamilton, Walter Kerr** (1808-69). British prelate. Born Nov. 16, 1808, son of Anthony Hamilton, archdeacon of



Walter K. Hamilton,  
British prelate  
After Richmond

Taunton, he was educated at Eton and Christ Church, Oxford, and was fellow of Merton, 1831, with Manning and Edward Denison. An adherent of the Oxford Movement (q.v.), he succeeded Denison as vicar of S. Peter-in-the-East, Oxford, 1837-41; was canon residentiary, Salisbury, 1841-54; and bishop of Salisbury, 1854-69. In his charges he maintained the doctrines of the Eucharistic Sacrifice, the Real Presence, and sacramental confession. He instituted diocesan retreats; established Salisbury Theological College, 1860; composed *Morning and Evening Services for Every Day in the Week*, 1842; and pub. *Cathedral Reform*, 1853. He died Aug. 1, 1869.

**Hamilton, William** (1665-1751). Scottish poet, a friend of Allan Ramsay. His *Seven Familiar Epistles* represent a correspondence in verse between the two poets. Hamilton is also remembered by his elegy on his dog *Bonny Heck* and by "Willie was a Wanton Wag." He wrote a modernised version of *Blind Harry's Wallace*, which attained considerable popularity. Generally

known as Hamilton of Gilbertfield, in Lanarkshire, where he long resided, he afterwards moved to Lattrick, and died there May 24, 1751.

**Hamilton, WILLIAM** (1704-54). Scottish poet, generally known as William of Bangour, in West



William Hamilton,  
Scottish poet

Lothian. He became involved in the Jacobite rebellion of 1745, and had to flee the country. He eventually returned and succeeded to the family estate, but his health made it necessary for him to go abroad again, and he died at Lyons, March 25, 1754. He was a contributor to Allan Ramsay's *Tea-table Miscellany*. His fame rests chiefly on the beautiful poem, *The Bonnie Braes of Yarrow*.

**Hamilton, SIR WILLIAM** (1730-1803). British diplomatist. Born Dec. 13, 1730, he was a grandson of the third duke of Hamilton, and in early life was a soldier. In 1761 he became an M.P. and in 1764 went to Naples as British minister. There he remained until 1800, varying his easy diplomatic duties with much social and sporting life and a keen study of volcanic activity, encouraged by his proximity to Vesuvius.

He made a valuable collection of antiquities, part of which, bought by the trustees of the British Museum in 1772, formed the nucleus of the department of Greek and Roman antiquities. Ancient vases especially were purchased by him in large numbers; he was an F.R.S. and wrote several books on volcanoes. His first wife, a Welsh heiress, having died in 1782, Hamilton persuaded Emma Lyon to live with him at Naples, and she remained his mistress until the two were married in 1791. About 1793 the pair made the friendship of Nelson, and the three spent a good deal of time together. Hamilton appears to have acquiesced in his wife's intimacy with the great seaman, who was present when he died, April 6, 1803.

**Hamilton, SIR WILLIAM** (1788-1856). Scottish philosopher. Born at Glasgow, March 8, 1788, and

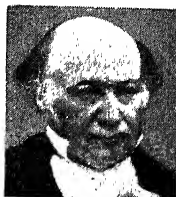


Sir Wm. Hamilton,  
Scottish philosopher  
*After J. Archer, R.S.A.*

an ardent supporter of university reform and an opponent of the tendency of the colleges to claim for themselves teaching and other functions which rightly belonged to the university. Hamilton, much influenced by Kant, gave a new turn to Scottish philosophy. He especially insists upon the relativity of knowledge; the absolute is not only unknowable, but also inconceivable; it is an object of faith, not of science. His most important work is his *Lectures on Metaphysics and Logic*, published after his death, May 6, 1836. *Consult* *The Philosophy of Sir W. H., S. V. Rasmussen*, 1927.

**Hamilton, WILLIAM GERARD** (1729-96). British politician. Born in London, Jan. 28, 1729, the son of a bencher of Lincoln's Inn, and originally intended for the law, he gave it up for politics. Having entered Parliament in 1754, his maiden speech in 1755, which Walpole declared never to have been surpassed by any except Pitt, earned him the title of "Single-speech Hamilton." The sobriquet is not quite accurate, as he later spoke with success in both the English and the Irish parliaments. After serving as chief secretary to the lord-lieutenant of Ireland, Hamilton entered the Irish Parliament and from 1763-84 was chancellor of the exchequer there. He died July 16, 1796.

**Hamilton, SIR WILLIAM ROWAN** (1805-65). Irish mathematician. Born at Dublin, Aug. 4, 1805, as a boy he showed an aptitude for languages, reading Latin and Greek, Persian, Arabic, and nine other languages before



Sir W. R. Hamilton,  
Irish mathematician

educated there and at Balliol College, Oxford, he became professor of history at Edinburgh in 1821, and professor of logic and metaphysics, 1836 to 1856. He was

the age of thirteen. Intended by his father for a post in the East India Co., his great genius for mathematics asserted itself and before his seventeenth birthday he had detected a mistake in Laplace's *Mécanique Céleste*. Sent to Trinity College, Dublin, his brilliance soon attracted attention. At the early age of 22 he was appointed professor of astronomy to the university. In 1835 he was knighted. During these years optics owed him a great debt for his remarkable theoretical researches, the chief of which resulted in his prediction of the phenomenon of conical refraction, leading to a remarkable proof of the undulatory theory of light.

The work by which Hamilton was to become best known was a system of mathematical analysis known as Quaternions (*q.v.*). The method was published in his *Lectures on Quaternions*, 1853, and *The Elements of Quaternions*, 1866. He died Sept. 2, 1865. *Consult* *Life, Rev. R. P. Graves*, 1883-89.

**Hamilton Academicals**. Scottish football club. One of the oldest in the country, it was formed in 1873. In 1904 it won the second division championship with 37 points out of 44 possible, and it has twice reached the Scottish cup final, being beaten in 1911 by Celtic and in 1936 by Rangers. Matches are played at Douglas Park, Hamilton.

**Hamilton Group**. A series of stratified rocks of marine origin, founded in N. America (New York state, Pennsylvania, Ontario, etc.). They form the upper division of Middle Devonian system in that region, and contain abundant fossils (trilobites, brachiopods, etc.). These rocks reach a thickness of 1,500 ft., and are extensively used for building and paving.

**Hamirpur**. District and town of Uttar Union, India, in Jhansi division. The district is flat and fertile, and is watered by the Jumna, which flows along the N. boundary, and other streams. Area 2,438 sq. m. Pop. (1951) 665,429. The town is the capital of the district, and stands on the Jumna, 150 m. S.E. of Agra.

**Hamitic**. Linguistically, Hamitic is a major African language grouping, closely related to the Semitic tongues. Its members are inflecting languages, suffixes indicating number, gender, or case, prefixes and suffixes expressing voice, mood, and tense. There are several plural forms. These languages occur mainly in northern and eastern Africa, there being



Wm. G. Hamilton,  
British politician

three major divisions. In E. Africa the Nilo-Hamitic group includes Masai, Turkana, Suk, Nandi. Farther north the Cushitic group includes the languages of Agau, Beja, Danakil, Galla, Sidama, Somali. In N. Africa Berber of the Mediterranean (*e.g.* Kabyle) and Sahara (*e.g.* Tuareg, Zenaga) are its representatives.

As applied to peoples, the term is vague; it is usually held to mean peoples who are brown-skinned, thin-lipped, narrow-nosed, orthognathous, with delicate features and slender physique.

**Hamlet.** Tragedy by Shakespeare. The scene is laid at Elsinore. Hamlet, prince of Denmark, learns from his father's ghost that the father was poisoned by his brother, who has succeeded to both his crown and his wife. Deeply affected, almost to the point of the madness which he immediately feigns, Hamlet sets himself to avenge his father after exposing the murderer. The interest of the play is centred upon Hamlet's tortured mind and the various ratiocinations which delay his action. The dénouement brings the death not only of the usurping king, but of the queen and most of the other leading characters of the play, including Hamlet himself; Laertes, killed by Hamlet; his father Polonius, the king's counsellor; and the latter's daughter Ophelia, who loses her reason before drowning herself.

Its stock of varying and exciting incidents, its store of pregnant utterances and maxims, which have found so permanent a place in the language that many people quote Hamlet habitually without knowing it, its fairly equal division into scenes of tragedy and comedy, above all the appeal of its leading character, have made Hamlet the most popular of all Shakespeare's plays. The many famous actors who have portrayed the part in recent times include Irving, Forbes-Robertson, Benson, Tree, Martin-Harvey, Matheson Lang, John Gielgud, and Donald Wolfit. Forbes-Robertson appeared in a silent film version, and Sir Laurence Olivier played the same rôle in a film made in 1947. Bernhardt, Mounet-Sully, and Rossi are among celebrated foreign players who have appeared as Hamlet. Robert Helpmann appeared in his own ballet based on Hamlet in 1942 and later essayed the part as an actor.

Hamlet is based on an ancient Icelandic saga of the Danish kings,

which found its way, in 1570, from the *Historia Danica* of Saxo Grammaticus, 1514, into Belleforest's *Histoires Tragiques*. There existed a previous play in English on the subject, probably by Kyd. Shakespeare's play was first acted at The Globe, 1602, with Burbage in the title-rôle, and there is a tradition that the poet took the part of the ghost. It was first published in 1603. There were four other quartos between 1604 and 1611. The existing text is collated from the Second Quarto of 1604 and the 1623 folio. The play is in five acts, contains 3,924 lines, of which 1,208 are prose and 2,490 blank verse, with 81 pentametric rhymes, and has found more commentators than any other of Shakespeare's plays.

**Hamley, Sir Edward Bruce** (1824-93). British soldier. Born at Bodmin, April 27, 1824, and educated at the R.M.A., Woolwich, he entered the artillery in 1843, and saw active service in the Crimean War. In 1859 he was appointed professor of military history at the staff college, where his lectures formed the basis of his great work *The Operations of War*, 1866. During 1870-77 he was commandant of the staff college, and in 1880 he was knighted.

Mortified at what he considered the lack of recognition of the part he played at the battle of Tel-el-Kebir, he issued a special report on the operations. Public sympathy was on his side, and he was made a K.C.B., but no further official employment was given him. He sat in parliament as Conservative member for Birkenhead from 1885, and died Aug. 12, 1893.

**Hamlin, Hannibal** (1809-91). An American statesman. Born at Paris Hill, Maine, Aug. 27, 1809,

he practised as a lawyer. During 1835-40 he was connected with the legislature of his state, of which he was governor in 1857. Member of congress 1843-47, he took up a strong anti-slavery attitude, and introduced the Wilmot Proviso prohibiting slavery in Mexican territory. He was a senator 1848-61 and 1869-81, and in 1854 left the Democrats owing to their attitude towards slavery, and joined the new Republican party, with the foundation of which he had much to do. He was vice-president of the U.S.A. 1861-65, and minister to Spain 1881-83. Hamlin died at Bangor, Maine, July 4, 1891.

**Hamm.** Town of W. Germany, in N. Rhine-Westphalia, 19 m. N.E. of Dortmund. Germany's chief rly. and canal junction, it stands on the Lippe at the E. end of Ruhr industrial area, and was itself an industrial centre, with iron-works and wire, engineering, and bridge-building plants. Its canal port handled up to 400,000 tons a year. The rly. marshalling yards at Hamm, the greatest in the country, were bombed 106 times by Allied aircraft during the Second Great War. In the neighbourhood are coal mines and thermal baths.

Founded in 1226 and from 1417 a member of the Hanseatic League, Hamm passed to Brandenburg together with Julich and Cleves in 1666. Its old fortifications were demolished in 1763. Of the old town, the Gothic church of S. Paul (13th-14th centuries), S. Agnes (16th century), and a town hall (15th century) were remarkable remnants. On April 3, 1945, troops of the U.S. 9th Army entered the town, which was cleared of German troops on April 6. Pop. (est.) 60,000.



Hamm, Germany. R.A.F. bombs falling on the great marshalling yards which, during the Second Great War, carried an enormous traffic in munitions  
Photo, British official, Crown copyright reserved

**Hammamet.** Gulf and town of Tunisia, on the N.E. coast. The town is situated on the gulf, 40 m. by rly. S.E. of Tunis, and is a popular bathing resort.

**Hammar-skjöld, DAG AGNE CARL** (b. 1905). Swedish economist and politician. Son of Hjalmar Hammar-skjöld (1862-1953), prime minister of Sweden, 1914-17, he was born at Jönköping, July 29, 1905, and studied law and economics at Uppsala University. Entering the civil service, he became secretary of the state bank and in 1936 under-secretary for finance. In 1946 he was transferred to the foreign ministry, and in 1949 promoted permanent under-secretary. In 1951 he became a member of the government, with the special assignment of assisting the foreign minister in international economic matters. Although he had appeared little



Dag Hammar-skjöld, U.N. secretary-general.

in the public eye of the world, he was in 1953 chosen to succeed Trygve Lie as second secretary-general of the United Nations.

**Hammer.** Percussion tool consisting of a metal or fibre head fixed on a shaft. Fibre or hard rubber-headed hammers are used for striking blows on soft metal parts which would be apt to suffer damage from a metal tool. The hammer of the carpenter or joiner has usually a flat-faced head at one side and a flattened, often clawlike, pene at the other. The engineer and mechanic use a hammer with a round head and a ball pene or cross-pene. Bricklayers use a club-hammer, with a short handle and comparatively heavy head. Stone-masons have special hammers for use on their steel chisels. Both the carpenter's and the engineer's hammer are made in sizes ranging in weight from a few oz. to 3 lb.

Heavier hammers, with much longer shafts, to drive road or rock chisels, are termed sledge hammers. The set-hammer, used

by the smith, is held upon the work by one operator while another strikes the tool with an ordinary hammer. A small type of mechanical hammer drives brick drills



Hammerfest, Norway. General view of the town and harbour. Top, right: the Meridian Column on Bird's Cape, marking the end of the meridian arc accurately measured, 1816-52

when making holes for wall plugs. More powerful are the mechanical hammers used for finishing the surface of concrete or masonry. See also Steam Hammer.

**Hammer, THROWING THE.** A branch of field athletics. It is of ancient date and probably Celtic



Hammer-headed shark. Specimen of *sphyrna zygaena*

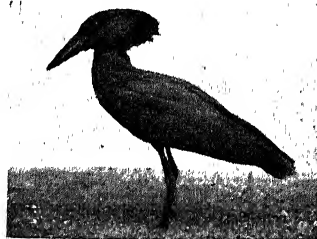
origin, as it has been for centuries a favourite pastime in Scotland and Ireland. Under the term casting the bar, it was a popular feature of rural sports in England, being a form of amusement indulged in by Henry VIII. The conditions governing modern hammer throwing require the performer to throw from inside a circle of 7 ft. in diameter, within which he must remain after having hurled the hammer. The hammer must weigh 16 lb. and not exceed 4 ft. in length. The head and handle may be of any shape, size,

or material. The American hammer consists of a steel wire handle with two loops for the hands, joined to the head by a ball-bearing swivel. A world record throw of 197 ft. 11 1/4 ins. was made by J. Csermak (Hungary) in 1952.

**Hammerfest.** Town of Norway, in the county of Finnmark. The most northerly town in the world, it stands on the W. coast of Kvalø island, which lies off the N.W. Norwegian shores in lat. 70° 40' N., 675 m. by sea N.E. of Trondhjem. Timber-built, the town suffered severely from fire, accidentally in 1890, and in 1944 when it was burnt by the Germans retreating before the Russians. The good harbour is the base of the Spitsbergen and Kara Sea whale fisheries. Cod-liver oil, train oil, salt fish, reindeer hides, fox skins, and eiderdown are exported, and a large trade is carried on with Archangel. Here the sun does not set from May 13 to July 29, and does not rise from Nov. 18 to Jan. 23. Pop. 2,297.

**Hammer-headed Shark** (*Sphyrna*). Name given to a group of sharks differing much in appearance from the ordinary ones. They include five species, and have the sides of the head expanded so as to resemble a hammer when viewed from above. The eyes are at the extremities of these lateral head processes. These fish are common in the tropic seas, and one species (*S. zygaena*) is occasionally found off the British coasts. They frequently attain a length of 14 ft., and are voracious and dangerous.

**Hammerkop,** HAMMERHEAD, OR UMBRETTE (*Scopus umbretta*). African bird, related to the herons and storks. It is about 2 ft. long and has brown plumage. When the crest of feathers at the back of the head is raised, it gives the head a certain resemblance to a



Hammerkop. Specimen of this large African bird

hammer. The bird is always found near water, and feeds chiefly on fish, frogs, and lizards.

**Hammersmith.** Metropolitan borough of the co. of London. It is bounded S. by Fulham and the Thames, where it is fringed by the Upper Mall and Lower Mall; W. by Chiswick and Acton; E. by Kensington; and N. by Willesden. It is on the main road A4 from London to the West, and is served by District, Piccadilly, Metropolitan, and Central Lines. Once a parish of Fulham, it was constituted a borough in 1899 and covers about 3½ sq. m. It possesses a fine town hall, 1939, three public libraries, and many churches and schools, the last named including S. Paul's, removed here from the city in 1883; S. Paul's school for girls; Godolphin School, dating from the 16th century; S. Clement Danes grammar school; and those of the Latymer foundation, 1824.

The parish church of S. Paul, consecrated by Laud in 1631, and rebuilt 1882, contains monuments preserved from the demolition of the old building. A suspension bridge erected across the Thames in 1827, the first of its kind near London, was replaced by the existing structure



Hammersmith  
arms

in 1887. This narrowly escaped destruction by I.R.A. bombs, Jan., 1939. The Lyric Theatre was opened April 20, 1891; under the direction of Nigel Playfair it achieved fame, e.g. producing Drinkwater's Abraham Lincoln in 1919, and reviving The Beggar's Opera in 1920. The King's Theatre was opened Dec. 26, 1902. In Blythe Road is the Post Office Savings Bank, 1903, and at Addison Road is Olympia, a glass-roofed building, 1886, used for varied exhibitions and shows.

At Shepherd's Bush are a common, 8 acres, opened 1871, and the White City Stadium built for the Franco-British exhibition and Olympic games, 1908, and the scene of later exhibitions. At Wormwood Scrubs are a prison, 1874, and two recreation grounds, 215 acres and 22 acres respectively, opened 1879 and 1886. Ravenscourt Park, 32½ acres, at the W. end of King Street, was acquired by the L.C.C. in 1887. Brook Green, 4½ acres, was made public in 1881. The Broadway is a busy rly. and bus centre, where six roads meet. The bus garage, near



Hammersmith. Bridge across the Thames, built in 1887; this view is from the towpath which runs along the Surrey side of the river

the parish church, includes the façade of Bradmore House, pulled down in 1913, once the residence of Elijah Impey, and occupying the site of Butterwick Manor House, Cromwell's h.q. in 1647.

Once noted for market gardens, orchards, and dairy farms, Hammersmith is now covered with small houses, iron and dye works, electric lamp, sugar, and other factories. Its notable residents have included Sir Nicholas Crispe, who built Brandenburg House, once the headquarters of Fairfax, and the home of Queen Caroline, wife of George IV; Kneller; Radcliffe; Morland; Thomson; Turner; William Morris; A. P. Herbert. With Fulham, Hammersmith forms three borough constituencies. Much damage was done by air raids during 1940-45. Pop. (1951) 119,367.

**Hammerstein, OSCAR** (1847-1919). An American impresario. Born in Berlin, he went at 16 to the U.S.A., where he made a fortune as a cigar maker. In a chequered career he built the Manhattan Opera House in New York, putting on seasons, 1906-10; also six other theatres in the city. The Philadelphia Opera House was started in 1908 and the American Opera House in 1912. His London Opera House, 1911, failed (it became the Stoll Theatre). He died Aug. 1, 1919. *Consult* The Amazing O. H., V. Sheehan, 1956.

Oscar Hammerstein II (b. 1895), a grandson, collaborated as librettist with Richard Rodgers (b. 1902), Irving Berlin, and others in successful "musicals," e.g. Show Boat, Oklahoma, Annie Get Your Gun, South Pacific. *Consult* Some Enchanted Evening, Deems Taylor, 1955.

**Hammer Toe.** Condition in which the first phalanx of the toe is bent upwards, and the second phalanx downwards, the third or terminal phalanx being bent either downwards or upwards. This re-

sults from wrong balance between the extensor and flexor muscles. The base of the toe presses upwards against the top of the boot, and the person walks on the extremity of the toe or even on the nail, the shape of the toe thus coming to resemble somewhat the head of a hammer. An operation involving removal of part of the toe is usually required.

**Hammerton, SIR JOHN ALEXANDER** (1871-1949). British editor and writer. Born at Alexandria in the parish of Bonhill, Dumbartonshire, of Anglo-Scottish parentage, he took to journalism in Glasgow, 1888, and edited newspapers at Blackpool, Nottingham, and Birmingham before settling in London as a writer and editor of books and periodicals, 1900. His name is associated as editor with many noteworthy publishing enterprises, such as The Punch Library of Humour, Peoples of All Nations, Countries of the World, Wonders of the Past, the Universal Encyclopedia (now reissued as the New Universal Encyclopedia), the Universal History, Practical Knowledge for All, and The New Book of Knowledge. Throughout each of the two Great Wars he edited the journal War Illustrated and standard contemporary histories, The Great War (13 vols.) and The Second Great War (9 vols.). He also founded (1939) and edited the monthly magazine World Digest.

He spent nearly two years, 1912-13, in Spanish America as managing editor of El Diccionario Enciclopédico Hispano-Americano, and his impressions of the Argentine and Uruguay are given in The Argentine Through English Eyes, 1917. Among his books are Stevensoniana, 1903, George Meredith: His Life and Art, 1909, An Outline of English Literature, 1927, Memories of Books and Places, 1928, a life of Barrie, 1929, With Northcliffe in Fleet St., 1932, two books of essays, As the Days

Go By, 1941, and Other Things Than War, 1943, and a life of Arthur Mee (*q.v.*), Child of Wonder, 1946. His autobiography, Books and Myself, appeared in 1944. Knighted 1932, for his services to popular education, he died May 12, 1949.

**Hammock** (Span. *hamaca*). Swinging bed of netting, canvas, fibre, skins, etc., suspended at



Hammock of the type used in the British navy

each end to supports. On ship-board, and particularly on warships, the hammocks are made of canvas, and in the old days of sailing vessels they were folded and stowed along the bulwarks to give some protection from the enemy's fire. The word is thought to have been derived from the fact that the natives of Brazil used the bark of the Hamack tree for nets in which to sleep.

**Hammond**. City of Indiana, on the boundary with Illinois, U.S.A., in Lake co. It stands on the Grand and Little Calumet rivers, 21 m. S.S.E. of Chicago, and is served by several rlys., a canal to Lake Michigan, and an airport. There are two harbours on Lake Michigan. One of the fastest growing cities of a very heavily industrialised region, Hammond had become the state's chief meat packing centre by 1900, but this industry then declined and was succeeded by steel. Rly. equipment, hospital and surgical supplies, and punch presses are made, and there are iron and brass foundries. Hammond was incorporated 1883. Pop. (1950) 87,594.

**Hammond**, AUBREY LINDSAY (1893-1940). British theatrical designer. Born at Folkestone, Sept. 18, 1893, he was educated at Bradfield and studied art at Julien's, Paris. From black-and-white work he developed an originality in stage settings and costumes for, *e.g.*, The Man with a Load of Mischief; The Sacred Flame; Jew Süss; The Dubarry; Wild Violets; Ballerina; The Shining Hour; To Have and to Hold. His designs for Shakespearian productions at Stratford-on-Avon were notable for their brilliant

colour. He also worked for the cinema and for commercial exhibitions. He died March 19, 1940.

**Hammond**, JOHN HAYS (1855-1936). American mining engineer. Born at San Francisco, March 31, 1855, he was educated at Yale, and in 1880 was appointed to the geological survey of the Californian gold fields. One of the leaders of the reform movement in the Transvaal, he disapproved of the Jameson Raid, 1896, but after its failure was sentenced to death, this sentence being commuted to imprisonment and later to a fine. Retiring to America, he

interested himself in mining and development schemes in the U.S.A. and Mexico. He attended the coronation of George V as representative of President Taft. Hammond died June 8, 1936.

**Hammond**, JOHN LAWRENCE LE BRETON (1872-1949). British historian. Educated at Bradford grammar school and S. John's College, Oxford, he became a journalist, edited The Speaker, 1899-1906, was leader writer on the Daily News, 1907, and special correspondent to the Manchester Guardian after the First Great War, joining the editorial staff in 1939. With his wife, (Lucy) Barbara (b. 1873), whom he married in 1901, he wrote standard books on conditions of the British working class, 1760 to 1832: The Village Labourer, The Town Labourer, The Skilled Labourer. Other publications included The Age of the Chartists, 1930; The Bleak Age, 1934; and a biography of Shaftesbury, 1923. He died April 7, 1949.

**Hammond**, WALTER REGINALD (b. 1903). English cricketer. Born at Dover, June 19, 1903, he went to Cirencester grammar school, and played cricket for Gloucestershire in 1920; as a professional 1923-37; as an amateur again from 1938. In 1928 he played for England in Australia and returned with a batting average of 113.12 in test matches. From then until 1939 Hammond had claims

to be regarded as the finest all-round cricketer in the world. He was a good bowler with the new ball and a brilliant slip fieldsman. In test matches against all countries he made more appearances (84 in all), more runs (over 7,000), and more catches than any other cricketer, and also had a record spell as captain. In English seasons he headed the batting averages in 1933 (in which year he scored 3,323), from 1935 to 1939 inclusive, and in 1946. He passed 1,000 runs in May, 1927, in Aug., 1933, and in Aug., 1936 (1,281); and made 15 centuries in 1938. That year he captained England against Australia, as he did on the 1946-47 tour. After the latter, Hammond retired from regular first-class cricket. He published Cricket My Destiny, 1946: Cricket My World, 1947.



Walter Hammond, English cricketer

**Hammurabi**, HAMMURABI, OR KHAMMURABI. King of Babylon c. 1790 B.C. His erstwhile identification with Amraphael, King of Shinar (Gen. 14), is highly doubtful. Sixth and greatest of the Amorite kings of the First Dynasty, he established the rule of Babylon over Sumer to the Persian Gulf and extended its territories to Mari on the Euphrates, Ashur in the N., the kingdoms E. of the Tigris, and Elam to the S.E. During his long reign Babylonia prospered; he built temples and dug canals, and developed a system of administration for his whole realm, known from his letters to provincial governors. His code of laws (*v.i.*) is his greatest memorial.

**Hammurabi Code**. Body of laws inscribed by Hammurabi (*v.s.*), king of Babylon, upon stelae which were set up in the principal cities of his realm. One such stela carried off by the Elamite king Shutruk-nakhkhunte c. 1200 B.C. to his capital Susa, and found there by J. de Morgan in 1902, is in the Louvre. Parts of other copies of the text are known. The Louvre stela, of black



Hammurabi Code. Stela inscribed with the code Louvre, Paris



diorite, is 7 ft. 3 ins. high, surmounted by a relief showing the sun-god delivering the laws to Hammurabi. Front and back are inscribed in Akkadian cuneiform.

The 282 extant sections recognized freemen or gentlemen, who had certain privileges in law but were most heavily penalised for misdemeanours; villeins or dependants of the palace, a sort of middle class socially and financially inferior to the freemen; and the large body of slaves. Penalties included fines, banishment, and various forms of mutilation; ordeal by water and the *lex talionis* were perhaps survivals from a more primitive system of justice.

Parts of codes earlier than that of Hammurabi and containing similar, sometimes identical, clauses, have been found on the sites of the cities of Ur, Isin, and Eshnunna; these indicate that Hammurabi was publishing a collection of rulings intended to unify legal practice where local usage had varied, rather than enacting new legislation. *Consult* The Babylonian Laws, G. R. Driver and J. C. Miles, 2 vols. 1952-55.

**Hamnett, NINA** (1890-1956). British artist. Born at Tenby, Pembrokeshire, south-west Wales, Feb. 14, 1890, she was educated at the royal school for daughters of army officers, Bath, and studied art at the London school of art. She exhibited at various London galleries; her portrait of Lytton Strachey hangs in the national portrait gallery, London. After the First Great War she lived much in Paris. In 1929, with Osbert Sitwell, she published her *People's Book of London Statues*. Her autobiographical *Laughing Torso*, 1932, caused a stir by its frank references to living persons. *Is She a Lady?*, a later volume of autobiography, appeared in 1955. She died Dec. 16, 1956, after an accidental fall from a window.

**Hampden, R.A.F.** bombing plane, a product of Handley Page. It was in service with bomber and coastal commands early in the Second Great War. A monoplane of unusual design, it had a fuselage to the rear of the bomb-bay that was a mere tail-carrying boom. The mid-mounted wing had a span of 69 ft. The Hampden was powered by two Bristol Pegasus engines which gave it a speed of 265 m.p.h. and a range of 1,990 m. Its bomb load could be 2,000 lb.

**Hampden, HENRY BOUVERIE WILLIAM BRAND, 1ST VISCOUNT** (1814-92). Speaker of the British

house of commons. Born

Dec. 24, 1814, and educated at Eton, he entered parliament as a Liberal, 1852, representing Lewes till 1868 and Cambridgeshire 1868-84. For many years a party whip, he was elected Speaker in 1872, and filled that office during the years of the Parnellite obstruction. The sitting of Jan. 31, 1881, lasted for 41 hours, and at 9 a.m., Feb. 2, Brand, on his own responsibility, closed the debate. This action led to the adoption of the closure as a form of procedure. On retirement from the chair in 1884, Brand was created Viscount Hampden. He died at Pau, March 14, 1892. The 3rd viscount was born in 1869 and succeeded to the title in 1906.

**Hampden, JOHN** (1594-1643). English statesman. The eldest son of William Hampden, of Great



John Hampden, British statesman

Hampden, Bucks, and Elizabeth, an aunt of Oliver Cromwell, he was probably born in London. Educated at Thame grammar school and Magdalen College, Oxford, in 1613 he entered the Inner Temple. He inherited his father's estates, and became M.P. for Grampound, Cornwall, in 1621; later he sat for Wendover and for Bucks.

In 1627 Hampden was imprisoned for refusing to pay a share of a forced loan raised by Charles I, and in 1635, on the attempt to raise ship-money from inland places, he refused again and was prosecuted; a majority of the judges decided against him, but the Long Parliament reversed their judgement. His courageous stand on a matter of principle established him as a popular figure, and he became one of the leaders of the parliamentary party, though always subordinating himself to Pym. He took part in the impeachment of Strafford, 1641, voted for the Grand Remonstrance, and in 1642 was one of the five members whose attempted arrest by the king led to the outbreak of the Civil War.

Hampden raised a regiment of infantry and led it to the relief of



1st viscount Hampden, British politician

Coventry and the siege of Reading. In a skirmish at Chalgrove Field, Oxon, June 18, 1643, he was badly wounded, and he died at Thame, June 24. Friend and foe united in regarding him as a man of uncommon honesty and selflessness. He had little initiative, ambition, or zest for leadership, but he inspired trust and showed efficiency as an organiser. *Consult* Memorials of Hampden, Lord Nugent, new ed. 1889; Life, H. R. Williamson, 1933; also Critical and Historical Essays, Lord Macaulay, 1843.

**Hampden, RENN DICKSON** (1793-1868). A British prelate. Born at Barbados, March 29, 1793, he was educated at Oriel College, Oxford, where he was fellow with Keble and Newman in 1814. After he had held curacies he became principal of S. Mary's Hall, Oxford, 1833, spending £4,000 on the buildings, and professor of moral philosophy, 1834. His Bampton lectures on the Scholastic Philosophy Considered in its Relation to Christian Theology, discussing the injurious effect of scholasticism on Protestant truth, were regarded as heretical. His appointment as regius professor of divinity, 1836, was opposed with some vigour by Newman, Pusey, and others, but defended by Arnold. His nomination in 1847 as bishop of Hereford was opposed by 13 bishops and led to some ineffective litigation. Hampden wrote *Lectures on Moral Philosophy*, 1856; *The Fathers of Greek Philosophy*, 1862. He died April 23, 1868.



Renn D. Hampden, British prelate  
After D. Macnee, R.S.A.

**Hampshire** or **HANTS.** County of southern England, officially the county of Southampton. It is bounded W. by Dorset and Wiltshire, N. by Berkshire, E. by Surrey and Sussex, and has a coast-line on the English Channel, where are the openings of Southampton Water and Portsmouth Harbour. The Isle of Wight forms part of the administrative county, although it has a separate council; it is described in a separate article. In the N. are downs, low-



Hampshire. Badge of county of Southampton

ranges of hills rising to nearly 1,000 ft. on the Berkshire border, and in the S.W. is the New Forest. The chief rivers are the Itchen, Test, Avon, Hamble, and Lymington. The area of the county, with the Isle of Wight, is nearly 1,650 sq. m.

Hampshire is mainly an agricultural county, a feature being the number of sheep reared. There are also many pigs. Wheat, barley, and oats are grown, but there is much waste or forest land, including, in addition to the New Forest, the forests of Bere, Woolmer, and Alice Holt. Winchester is the co. town. Largest places are the two great seaports, Southampton and Portsmouth; the county also includes Bournemouth, Southsea, Aldershot, and Eastleigh. Some of the small market towns, e.g. Andover, Basingstoke, Christchurch, Romsey, and Lymington, are boroughs with a long history behind them; others, not now boroughs, are equally old—e.g. Petersfield, Fareham, Alton, Odiham, Whitchurch, and Stockbridge were, at one time or other, represented in parliament. Farnborough and Gosport are of more recent growth. Hurn airport is 6 m. N. of Bournemouth. Hampshire (excluding the Isle of Wight) is divided into five

co. and eight bor. constituencies. It is in the dioceses of Winchester and Portsmouth.

There are abbey ruins at Beaulieu and Netley and beautiful old churches at Christchurch and Romsey. Of old castles there remain Porchester and Hurst. Other ruins are at Basing House; Stratfield Saye, the seat of the duke of Wellington; Hursley; and Titchborne. At Bishop's Waltham the bishop of Winchester had a palace. Porchester was a Roman station. Notable houses include Heron Court, near Christchurch, and Broadlands, once the residence of Palmerston. Hampshire was the birthplace of cricket (see Hambleton). Pop. (1951) 1,196,617.

**LITERARY ASSOCIATIONS.** Hampshire was first notably used as a literary background in Gilbert White's *Natural History of Selborne*. Jane Austen made capital out of the comfortable classes of the county in which most of her life was spent (Steventon and Chawton). Cobbett extended his *Rural Rides into Hampshire*. Kingsley, rector of Eversley, dealt with the county in *Yeast*, *Howard the Wake*, and *Madam How and Lady Why*. Hardy introduced Bournemouth and Winchester into

Tess of the D'Urbervilles. Hampshire Days is one of W. H. Hudson's most attractive books. The *Victoria History of the co.* appeared in 5 vols., 1908-12.

**Hampshire.** Name of several British warships. On June 5, 1916, off the Orkneys in extremely rough weather, an 11,000 ton cruiser of this name, which was conveying Lord Kitchener, secretary for War, on a mission to Russia, ran into a minefield and sank. There were only twelve survivors of over 600 officers and men, among those lost being Kitchener. See Kitchener, 1st Earl.

**Hampshire Regiment, ROYAL.** Formerly the 37th and 67th Foot, raised in 1702 and 1758 respectively.



Royal Hampshire Regiment badge

The former regiment first saw active service in Holland, afterwards taking part in Marlborough's battles. At Dettingen, 1743, and at

Minden, 1759, it played a notable part. The combined regiment formed a portion of the "fighting brigade" employed against the French in Holland, and distinguished itself at Tournai, 1794, and at Barossa, 1811. Later campaigns include the Indian Mutiny, the China War, 1860-61, the Afghan War, 1878-80, and the Burmese War, 1885-87. After the S. African War it saw field service in Somaliland.

In the First Great War, battalions of Hampshires, regular and territorial, served on five battle fronts as well as in Aden, Persia, and Siberia, and at Archangel. In the Second Great War they fought in Malta, N. Africa, Sicily, Italy, France, Belgium, Holland, Germany, and Burma. The regiment became the Royal Hampshire Regiment Dec., 1946.

**Hampstead.** Metropolitan borough of London, and residential district. Occupying about 3½ sq. m., it is served by suburban electric and underground rlys. and by London Transport. Modern buildings include the town hall; public libraries; New College (Congregational); Westfield college for women; University College School; Hampstead general hospital, on the site of houses including one once



Hampstead arms



Hampshire. Map of this South of England coastal county



Hampstead Heath, London. View showing (behind the fencing) the site adjoining Jack Straw's Castle bought in 1852 and added to the Heath. The additional space was more than three acres in extent

the home of Sir Rowland Hill; New End hospital; the Medical Research Council laboratories (formerly Mount Vernon Hospital); and the Royal Soldiers' Daughters' Home. The church of S. John, 1747, replaced a structure pulled down in 1745, and contains a facsimile bust of Keats, by Anne Whitney, presented by Americans—the original being in the Keats museum, Keats Grove.

In the churchyard were buried Sir James Mackintosh; Joanna Baillie, who lived at Bolton House; Lucy Aiken; John Constable; George Du Maurier, who lived at New Grove House; Sir Walter Besant; Wilson Barrett.

For long a favourite residence of artists and literary men, Hampstead is full of associations. In 1749 Dr. Johnson wrote part of *The Vanity of Human Wishes* at Priory Lodge (since demolished); Clarkson Stanfield lived at Stanfield House; Sir Harry Vane was arrested at his residence here in 1660; Keats, who wrote *Hyperion* and *The Eve of St. Agnes* at Lawn Bank, also lived in Well Walk, as did Constable. Other notable inhabitants include Romney, John Linnell, Akenside, Arbuthnot, Mrs. Barbauld, Leigh Hunt, Steele, Talleyrand, Edward Irving, Baron Erskine, Lord Mansfield, the 1st earl of Chatham, William Beckford, Spencer Perceval, Galsworthy, Gerald Du Maurier, Dame Myra Hess, Elgar, Sir Henry Wood.

The manor, referred to in *Domesday*, is owned by the Maryon-Wilson family. The history of Hampstead is

linked with that of Belsize; and it may have been part of Hendon in the 16th century. With Highgate (*q.v.*) it was once a favourite hunting ground. Its chalybeate wells are said to have been known to the Romans, and Well Walk and Flask Walk recall the fashionable spa of the 18th century, the scene of novels by Fanny Burney and Richardson. Queen Mary's maternity home was built on the site of Upper Flask Tavern, where the Kit-Cat Club sometimes met.

Hampstead Garden Suburb, situated N. of Hampstead Heath extension, of which it was an outcome, and E. of Golders Green (*q.v.*), was founded by Henrietta Octavia Barnett (1851–1936), who formed a company in 1906, when the 240 acres were purchased from the Eton College trustees. The land had not previously changed hands since the time of Henry VIII. The first sod was cut May 4, 1907. Hampstead forms a borough constituency. Pop. (1951) 95,131. See Bull and Bush; Jack Straw's Castle; Ken Wood; Spaniards, The. Consult *Annals of Hampstead*, T. J. Barratt, 3 vols., 1912.

**Hampstead Heath.** Open space in N.W. London. It occupies the summit and N. slopes of Hampstead Hill, and reaches at its

highest point 443 ft. a.s.l. From its higher stratum of Bagshot sand, some 80 ft. thick above the London clay, issued the Holbourne, Tybourne, and other streams which once traversed the capital. The heath, famous for its fine trees, broken hillocks, wild gorse, grass glades, extensive views, and old inns, covers over 250 acres; Heath extension (80 acres), Parliament Hill (265 acres), Golders Hill (36 acres), and Ken Wood (about 200 acres) all adjoin.

Down to the early days of the 19th century a haunt of highwaymen and robbers, it once saw races, and remains a popular resort on bank holidays, with swings and roundabouts for the occasion. Preserved from enclosure by the Metropolitan Commons Act, 1866, the greater part was acquired as a public recreation ground in 1870; additional ground was acquired later. Old inns on and near the Heath are the Bull and Bush, Jack Straw's Castle, and the Spaniards.

**Hampton.** Part of the bor. of Twickenham, Middlesex, England. It stands on the left bank of the Thames, 15 m. S.W. of London. Hampton Court (*q.v.*), 1 m. to the S.E., and Bushy Park (*q.v.*) are within its boundaries. The parish church of S. Mary, built in 1830 on the site of an older structure, was enlarged and restored in 1888 and 1898; in the churchyard lies Huntington Shaw (d. 1710) who wrought the iron gates at Hampton Court.

At Garrick Villa, formerly Hampton House, E. of the church, David Garrick lived, 1754–79. There is a 16th-century grammar school. To the W. of the village are large waterworks under the control of the Metropolitan Water Board. Near are Kempton Park and Hurst Park racecourses; Hampton has a ferry to Molesey Hurst. The manor, which belonged



Hampstead. Church Row, a characteristic street of this metropolitan borough of north-west London

in Edward the Confessor's time to Earl Algar, is mentioned in Domesday, and was once held by Wolsey. Pop. 13,053.

**Hampton Court.** Palace on the left bank of the Thames, between Hampton and Hampton Wick, Middlesex, 15 m. S.W. of London Bridge. Built by Cardinal Wolsey in 1515, and surrendered by him to Henry VIII in 1526, it remained a royal residence until the time of George III. The red brick buildings containing more than 1,000 rooms, cover 8, and the gardens 44, acres.

The E. and S. wings were built by Wren; the gardens were laid out for Charles II and William and Mary. The state apartments were restored and opened to the public in 1839. The Haunted Gallery is said to be visited by ghosts of Strafford, Jane Seymour, Catherine Howard, and Mrs. Penn, Edward VI's nurse. The Chapel Royal was opened to the public in 1918. Many paintings, including Lely's portraits of court beauties, tapestries royal beds and suites of furniture, etc., and an astronomical clock are to be seen. Features of the gardens are

the grape vine, planted 1768, the maze, and the Long Water. The Home Park covers 600 acres; adjacent is Bushey Park (1,000 acres), famous for its chestnut avenue and tame deer. The old moat was opened up in 1910.

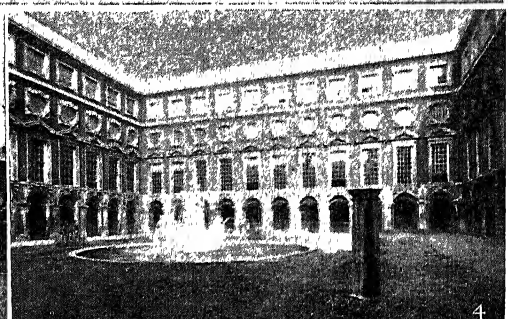
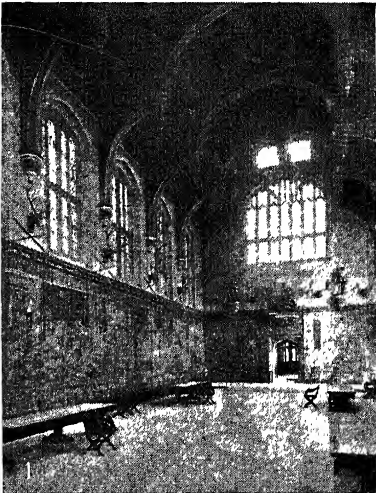
At Hampton Court, Edward VI was born, Jane Seymour died, Catherine Howard was disgraced, Henry VIII married Catherine Parr, Philip and Mary, also Charles I and Henrietta Maria, spent their honeymoons, Charles I was a prisoner, James I presided over the Prayer Book conference, the authorised version of the Bible was planned, and William III was injured while riding. Portions of the palace buildings were slightly damaged by German bombs in the Second Great War. Present residents are principally royal pensioners.

**Hampton Court Conference.** Conference arranged by James I in 1604 at Hampton Court between the bishops and four representatives of the Puritan clergy. James had just ascended the English throne, and the Puritans had petitioned him to recognize their

views as to certain changes in the Prayer Book and upon ceremonies and vestments. The proposals of the petitioners were rejected, and James administered a scolding to their representatives.

**Hampton Roads.** Channel in Virginia, U.S.A., which connects the estuary of the James with Chesapeake Bay, the mouths of the Elizabeth and Nansemond also being here. Here are the ports of Norfolk, Newport News, and Portsmouth, the site of a U.S. naval yard. Forts Monroe and Wood are at the entrance.

**Hampton Roads, BATTLE OF.** Naval engagement during the American Civil War, March 8-9, 1862. On March 8 three Confederate ships, the largest of which was the ironclad Virginia, formerly the Merrimac, entered Hampton Roads, set fire to the Federal frigate Congress, and sank the sloop Cumberland. The Confederates got away with little damage, but the same evening the Federal ironclad Monitor, which had been launched earlier in the year, steamed into the Roads, and the following morning put out to



Hampton Court. 1. Interior of the Great Hall, built by Henry VIII, 1530-35. 2. West Front and Great Gatehouse, built by Cardinal Wolsey. 3. Anne Boleyn's Gateway, in which is the entrance to the Great Hall. 4. Fountain Court, designed by Sir Christopher Wren

give battle to the Merrimac. The latter vessel was already crippled, and the action of the Monitor during the engagement and her superiority over the Merrimac were a signal success for her designer, Ericsson (*q.v.*). This was the first encounter between armoured warships. See American Civil War.

**Hampton Wick.** Parish and village of Middlesex, England. It is situated on the Thames opposite Kingston, with which it is connected by a bridge, and is 2½ m. E. of Hampton, with a rly. station. The church of S. John Baptist was enlarged 1887. The duke of Nemours lived at Bushey House. Steele lived at Hampton Wick for a time, and Timothy Bennet, who secured the public way through Bushy Park, was a native of the parish. Pop. (1951) parish, 8,095.

**Hamrin Hills** OR JEBEL HAMRIN. Range of hills in Iraq. It came into prominence during the First Great War in the course of British operations against the Turks, who were defeated here in April, 1917. It runs N.W. from the DIALA, an eastern tributary of the Tigris, to the Tigris about the village of Fathali, and is traversed from N. to S. by the Shat el Adhaim, another affluent of the great river. The average height is 2,000–3,000 ft. See Mesopotamia Campaign.

**Hamster** (*Cricetus*). A small rodent, common in Asia and N. Europe, especially in some parts of Germany. It is less than a foot long, and has about 2 ins. of tail. The thick fur is yellowish brown in colour, glossy, and has a modest value in the trade for lining garments. The animal lives in



Hamster, a North European rodent

burrows, rather elaborately constructed, consisting of a dwelling chamber and a granary which are connected by galleries and provided with separate tunnels for entrance and exit.

Sometimes four or five granaries will be found in a single burrow. These are used for storing corn for consumption in winter, during which season the hamster keeps below ground and spends most of its time in profound sleep. Separate burrows of a simple kind are constructed for the summer, in

which the young are reared. Two families, ranging in number from six to eighteen, are reared every season, hence the hamster often becomes a most destructive pest to crops. Its flesh is eaten by the country people. The golden hamster (*C. auratus*) of Palestine is used in laboratory experiments.

**Hamsun, KNU** (1859–1952). Norwegian novelist. Born Aug. 4, 1859, he was brought up as a cobbler in the Lofoten Isles, and worked as clerk, teacher, street-car conductor in the U.S.A., farmer, and in the Norwegian fisheries. His success as a novelist began with the publication of *Sult* (*Hunger*) in a Danish magazine. *Pan*, 1895, is perhaps his greatest work, though English readers are most familiar with *Growth of the Soil*, published 1917, and trans. 1920. His style shows the influence of the Russian school, and has affinities also with the Americans. Other works which have been trans. into English are *The Women at the Pump*, 1928; *Chapter the Last*, 1929; *Vagabonds*, 1931; *The Road Leads On*, 1935. In 1920 he was awarded the Nobel prize for literature.

When the Germans invaded Norway in 1940, Hamsun supported Quisling and during the occupation wrote in the Norwegian and German press in favour of the Nazis. In 1946 the Norwegian state attorney announced that no action would be taken against him in view of a medical report, but his wife was sentenced to three years' imprisonment and a fine of £3,750. In 1947 Hamsun, sued by the directorate of compensation, was ordered to pay £21,250 and costs. He died Feb. 19, 1952.

**Hamtramck.** City of Michigan, U.S.A., in Wayne co. Though surrounded by the city of Detroit, it has resisted annexation. The pop. (43,355 in 1950) is predominantly Polish, public notices being in Polish as well as English. The establishment of a motor car factory in 1914 led to a phenomenally rapid increase in its pop. In 1922 it became a city. The Hamtramck public school code for adult education has been widely adopted in the U.S.A. and elsewhere. The name derives from Col. Hamtramck, who took command of the fort of Detroit when the British surrounded it in 1796.

**Han.** River of China. It takes its rise in the Ta-pa-ling mts. of Shensi, and flows E. and S. across the provs. of Shensi and Hupei, to effect a junction with the Yangtse-kiang at Hankow. Floods are

common, but the river is navigable by small craft to Simpuwan, a distance of 1,260 m., and for large junks to Fancheng, 450 m. Much traffic is carried on the river, which is 1,300 m. in length, and passes several important towns. The Han has often changed its course.

**Hanaper** (late Lat. *hanaperium*, hamper). Name given to a wicker basket in which documents were kept in the English chancery, and so to a department of that court of law. Controlled by the clerk of the hanaper, the department used to receive the fees for sealing charters, patents, and writs under the great seal. The office of keeper of the hanaper was abolished in 1842.

**Hanau.** Town of W. Germany, in the Land of Hesse. It stands in fertile country at the confluence of the Main and Kinzig rivers, 14 m. E. of Frankfurt; after the Second Great War it was in the American occupied zone. It was granted urban rights in 1303, and fell by inheritance to the house of Hesse in 1736. Napoleon won a victory here, Oct. 30–31, 1813, over a Bavarian-Austrian army which was trying to cut him off from the Rhine after Leipzig. Refugees from the Low Countries settled in Hanau in the 17th century and founded its important diamond cutting and jewelry industry; other factories in the town manufacture surgical instruments, chemicals, motor tires, leather goods, and cigars. The brothers Grimm were born at Hanau; there is a memorial to them. The town, severely damaged in 1940–45, contained a number of fine old buildings, outstanding among which were the 15th century church of S. Mary, the old town hall (1538), and the Philippsruhe palace (1710), once the seat of the Hessian dynasty. Wilhelmsbad mineral springs are near. Pop. (est.), 45,000.

**Hancock, SIR WILLIAM KEITH** (b. 1898). Australian historian. He was born at Melbourne, June 26, 1898, and was a fellow of All Souls, Oxford, 1924–30. He was professor of modern history at Adelaide, 1924–33; of history at Birmingham, 1934–44; Chichele professor of economic history at Oxford, 1944–49; professor of Commonwealth affairs in London University, 1949–56. He was knighted in 1953. His publications included *Ricasoli*, 1926; *Australia*, 1930; *Survey of British Commonwealth Affairs*, 1937, 1940, 1942; *Argument of Empire*, 1943; *Politics in Pitcairn*, 1947.



**Hand.** Prehensile extremity of the arm. It consists of three divisions—the carpus or wrist, the metacarpus, and the phalanges of the fingers. The carpus consists of eight small bones arranged in two rows. From the radial to the ulnar side, the bones of the first row are the scaphoid, lunar, pyramidal, and pisiform. Those in the second row are the trapezium, trapezoid, os magnum, and unciform. The metacarpus consists of five long bones, which articulate at the upper end with the wrist, and at the lower end with the first phalanges of the fingers. The phalanges are fourteen in number, three for each finger and two for the thumb.



**Hand.** Left, of a negro from the Blue Nile; right, of a very aged gorilla, showing the shorter thumb typical of the apes

The hand is supplied with blood-vessels derived from the radial and ulnar arteries of the forearm. The palm of the hand is protected by a strong and dense layer of tissue lying beneath the skin, known as the palmar fascia. In middle-aged persons this fascia may contract, causing some fingers, often the ring and little fingers, to be drawn in towards the palm, thus crippling the hand. This condition, Dupuytren's contraction, as a rule requires operative treatment, but even then tends to recur. There is no fundamental difference between the hands of the higher apes and those of man. The chief difference is in the thumb, always shorter in the ape, and in the degree of its opposability. It is most human in the chimpanzee, and in some of the Anthropeidea is practically absent. *See* Anatomy.

**Hand.** English measure of length. Like foot, it originated from a human limb, being the breadth of a man's palm. After a time a fixed length was given to it and it is now 4 ins. It is only used for measuring horses.

**Handbells.** Small bells of sweet tone, used both for the sake of their own music, and also for



**Handbells.** Set of bells in diatonic scale

practising the changes (*q.v.*) for ringing on church bells. One player can easily control four handbells, two with each hand, if their handles are leather loops, and the clappers only act when swung in one direction. Parties of five or six players can thus operate a large number of bells, and perform elaborate music in harmony. *See* Campanology.

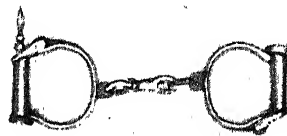
**Handcuffs.** Devices for fastening the wrists of prisoners. Modern handcuffs consist

of two metal rings adjustable to various sizes by means of a ratchet, and fastened together by a short length of chain. Formerly handcuffs were rigid, and a police officer was compelled to carry two or three sets when he went to arrest a prisoner. Handcuffs with no connecting chain, shaped like a figure eight, fixed the wrists in one position, and often caused great pain. Some handcuffs fit only on one wrist, the other part being held by the officer in charge of the prisoner. Snap-handcuffs enable a detective to imprison one wrist of an offender with a single movement. Nippers are a variety of those handcuffs which are used only on one wrist, the other part of the handcuff forming a handle. Twisters are a similar arrangement, the metal ring being replaced by a short length of chain that can be twisted round the prisoner's wrist. The latter are not used in Great Britain.

**Handel, GEORGE FREDERIC** (1685-1759). Anglo-German composer. Born at Halle, Saxony, son of a surgeon-barber, Feb. 23, 1685, at a very early age he revealed the possession of great musical gifts but received no encouragement from his father to develop them. Eventually he became a pupil of Zachau, organist of the cathedral at Halle, and spent some time in Berlin, afterwards becoming organist at Halle. In 1703 he went to Hamburg and played the violin in the orchestra of the Opera House; then his first opera, *Almira*, was produced in 1705. He went to Italy for three years to study the methods of Italian opera

composers, and whilst there produced several operas with great success.

In 1710 Handel returned to Germany, and was appointed "chapel-master" to the elector of Hanover, afterwards George I of England. The same year he came to England, where, apart from a few short visits to Germany, he spent the remainder of his life. He introduced himself to English audiences by his opera *Rinaldo*, which aroused great enthusiasm. Other operas followed; also a *Te Deum* to celebrate the peace of Utrecht in 1713. For some time he was organist to the duke of Chandos at Canons, Edgware. In 1719 the Royal Academy of Music was established for the performance of opera, and Handel specially composed many operas



**Handcuffs.** Pair of handcuffs in common use by the British police

for this society, which came to an end in 1728. He then became interested in other operatic schemes, which, however, were unsuccessful owing to financial difficulties, the quarrels of singers, and the opposition of rival composers.

He next turned to oratorio, and began that series of sacred works upon which his fame rests. *Saul*, and *Israel in Egypt*, were composed in 1739, *Messiah* and *Samson* both in 1741, *Judas Maccabeus* in 1746, and his last oratorio, *Jephtha*, in 1751. During this period he was



*George Frederic Handel*

From a picture in Windsor Castle



subjected to all kinds of petty antagonism and serious financial loss. Prosperity set in later but health declined, and he was blind when he died, April 14, 1759. He had been a naturalised British subject since 1726.

Handel's output was enormous, in quantity exceeding that of Bach and Beethoven together. Besides 41 operas and 27 oratorios he wrote cantatas, chorales, organ concertos, orchestral suites, and sonatas. He was deeply indebted to the Italians but greatly extended their emotional range. Though he stands in the forefront of the classical style, his treatment of the orchestra is dramatic. It would be hard to name a greater melodist, and in even the forgotten operas there are gems of music, like the celebrated Largo (from *Serse*), the Minuet (from *Berenice*), and the aria *Where'er You Walk* (from *Semele*), which are household tunes, just as the *Dead March* (Saul) and *See the Conquering Hero* (Judas Maccabaeus) are familiar from constant use on public occasions. Handel's organ music ranks next to that of Bach, while as a writer for solo voice or choir he has no peer. *Messiah* (q.v.) is probably the most popular musical work in England, where Handel is more highly esteemed than anywhere else. His collected works were printed for the Handel Society, 1844-58. There are *Lives* by S. Rockstro, 1883; R. A. Streatfeild, 1909; N. Flower, 1947.

**Handfasting.** Form of provisional marriage formerly prevalent in Scotland, so called because the couple exchanged vows holding hands. They were then legally entitled to live together as man and wife for a year and a day, after which period they could either part or be married permanently. The child of a couple who parted was supported by the parent who severed the union. Handfasting was also the old English name for betrothal. *See* Marriage.

**Hand-grenade.** An explosive hand missile. A hand-grenade can usually be thrown about 50 yds., and should not, therefore, have an explosive effect over a greater radius than 30 yds. The provision of a suitable fuse is a matter of difficulty, both percussion and time fuses having their drawbacks. *See* Grenade.

**Handicap.** In sporting contests, term denoting the bringing together, by penalties and allowances, the chances of the various competitors in such a manner as to afford an equal chance to each. In

foot-racing, billiards, etc., this is accomplished by giving a start to the runner or player who is the inferior performer. In horse-racing, handicapping is effected by apportioning different weights to the various horses entered. Such races or contests are designated handicaps. The word is a contraction of hand in the cap, in reference to the drawing of lots.

**Handkerchief.** Square of linen, cotton, or silk for wiping the nose. It came into use about the time of Henry VIII, and Elizabeth's reign saw handkerchiefs decorated with lace and made of silk. A muckinder or muckender was a handkerchief usually attached to the girdle, and worn by children about the beginning of the 17th century.

**Handley, THOMAS REGINALD** (d. 1949). British comedian, known as Tommy Handley. Born



Tommy Handley,  
British comedian

and educated in Liverpool, he made his debut at Daly's Theatre in the chorus of *The Maid of the Mountains*, 1917, before joining the R.N.A.S. After the war he was a member of various seaside concert parties, then was successful on the music-hall stage with a sketch, *The Dis-Orderly Room*. His first broadcast was in 1924. His greatest fame came through broadcasting with the success of the weekly programme, *It's That Man Again* (or *ITMA*), of which he was the central figure. First broadcast July 12, 1939, it was given a new form with Ted Kavanagh as script-writer in the autumn of that year, when Handley was among the original members of the B.B.C.'s war-time variety repertory company at Bristol. Its high spirits, great speed, and unique nonsensical quality then soon made *Itma* the most popular B.B.C. programme in history, and it remained a leading feature of British radio, with only short intervals, until Handley's sudden death, Jan. 9, 1949, when aged about 55. Handley was the only actor to take part in all 310 programmes. He also participated in successful radio and music-hall partnership with Ronald Frankau as *Winterbottom* of "Murgatroyd and Winterbottom." *Consult* T. H. T. Kavanagh, 1949.

**Handley Page.** Firm of British aircraft manufacturers; also name of the aircraft it produced. The

firm was founded in 1909 by F. Handley Page (q.v.), who was knighted in 1942. The firm manufactured the largest bombers operated by the R.F.C. and R.A.F. in the First Great War: the twin-engined O/400 of 1915 and the four-engined V/1500 of 1918. Between the wars outstanding Handley Page machines were the Hyderabad, Heyford, and Harrow bombers, and the H.P. 42 air liner series for Imperial Airways. Then came the twin-engined Hampden (q.v.) and four-engined Halifax (q.v.) bombers. Post-war types included the military Hastings and the commercial Hermes.

**Handsel.** Earnest money; payment by a purchaser of part of an agreed sum into the vendor's hand to bind a contract. The word is also applied to the first money taken at a market or on opening a new business, and in the north of Great Britain to presents made for luck. Thus in Scotland Handsel Monday is the popular name for the first Monday in the year, when presents of money are given in token of good will.

**Handsworth.** District of Birmingham, England. Until 1911 it was a separate urban dist., with a pop. of 60,000. Lying to the N.E. of the city proper, it is in Warwickshire, and gives its name to a parl. div. The parish church is the burial place of Matthew Boulton and James Watt.

**Handy Andy.** Irish story, by Samuel Lover, 1842, and name of its chief character. The book is full of frolicsome fun, and long set a sort of standard for Irish humour of the more farcical kind. Andy himself is a typical blunderer, and many of the episodes were long popular as readings or recitations.

**Hangar** (Fr. shed). Building to house aircraft. Although modern machines will usually stand up to a degree of exposure hangars are always provided at permanent airfields in order to facilitate repair and maintenance work, as well as storage.

**Hangchow.** Town of China, capital of Chekiang prov. It is on the Tsien-tang river, and was opened to foreign trade in 1896, being a treaty port until the Second Great War. It has an important silk industry. It is 118 m. S.W. of Shanghai, with which it is connected by rly. and waterways. The tide in Hangchow bay, at the mouth of the Tsien-tang, forms a bore twice daily, varying in height from a few feet to 20 ft. (at times even 30) at the equinoxes. Pop. 506,930.

**Hangchow Bay.** Large inlet of the E. China Sea, indenting the shore of the prov. of Chekiang. It penetrates inland for about 110 m. and receives the waters of the Tsien-tang, on which, 20 m. from its mouth, stands the port of Hangchow. At its entrance the distance across is 52 m.

**Hanging.** Death from constriction of the neck, the constricting force being the weight of the body. In modern judicial hanging, in which a long drop is allowed, death is practically instantaneous, being due to fracture or dislocation of the upper cervical vertebrae which produces compression or rupture of the spinal cord (breaking the neck). In the old form of execution, which was practised at Tyburn, the noose was placed round the neck of the condemned person while standing on a cart, which was then driven away from beneath him. In this method, and in most suicidal hangings, death is due partly to asphyxia and partly to arrest of the circulation in the brain by compression of the large blood-vessels in the neck. Hanging as a method of committing suicide is more common among males than among females.

Murder by hanging is almost unknown, but several instances are recorded of a murderer suspending the body of his victim after death in order to suggest suicide. See Capital Punishment.

**Hanging Gardens of Babylon.** One of the seven wonders of the ancient world, described by many classical writers though not by Herodotus. Associated by one tradition with Semiramis, they more probably formed part of the palace of Nebuchadnezzar II at Babylon; he married a Median princess, and the gardens, their treetops rising above the hot city, may have been built to remind her of her mountain home. They are described as built on a vault in a series of terraces, artificially watered from the Euphrates and planted with a profusion of trees and flowering shrubs. In the ruins of the great palace at Babylon Koldewey found a vaulted building which he thought might have been the Hanging Garden.

**Hanging Valley.** Tributary valley leading to an over-deepened main valley. Many valleys in mountainous districts have been considerably deepened below the level of the side valleys. The rivers of these tributary or hanging valleys descend to the main stream by waterfalls. The general belief is that hanging valleys were

produced by glacial erosion, and this is supported by the fact that they are especially numerous in glaciated regions. Some still contain glaciers. See Fiord.

**Hangnest.** Popular name for a large group of American birds (*Icteridae*) known also as troupials. Related to the starlings, they take their name from the curious nests they construct. These are closely woven of grass and hair, are rather purselike in shape, often 2 ft. long, with the entrance near the bottom, and hang from the slender branches of trees. As many as 40 nests have been found in a single tree.

**Hangö.** Swedish and more familiar name of the Finnish fortified port of Hanko. It is on the peninsula Hangö-Udd, at the entry to the Gulf of Finland, and the terminus of the coast rly. from Leningrad. The harbour is safe, and there is a good shipping trade. The chief exports are butter, timber, and paper. Hangö was among the concessions that Russia demanded from Finland in 1939. Russian troops attempted a landing on Nov. 30 and the place was heavily bombed by aircraft. It was leased to Russia for 30 years as a military base in accordance with the peace treaty of 1940. On Dec. 4, 1941, the Russians withdrew, Finland having become an ally of Germany. By the armistice signed on Sept. 19, 1944, Russia renounced her rights to the lease of the peninsula in exchange for an area near Helsinki.

**Hank.** Standard measure of length; also a convenient form in which to put up yarns for transit. Thread is wound off a bobbin round the arms of a reel. Eighty wraps round the  $\frac{1}{2}$ -yard reel used in cotton yarn represent one lea or 120 yds. Seven leas equal 840 yds., or one cotton hank. For measuring worsted yarns the reel has a circumference of one yard; the worsted lea is thus 80 yds., and the worsted hank 560 yds., or one-third less than cotton. The linen lea is 300 yds., and the spun silk hank is 120 yds.

The hank is in effect a large skein and after being measured it is tied with a thread which separates lea from lea and holds the end of the thread. The hank is knotted for convenience by being twisted and folded back upon itself. The hanks are then bundled into neat packages normally of 10 lb. weight.

**Hankey, MAURICE PASCAL ALERS HANKEY, 1ST BARON** (b. 1877). British civil servant. Born April 1, 1877, he was educated at Rugby, and joined the Royal

Marines in 1895. During the First Great War he was secretary to the war cabinet in 1916 and then to the imperial war cabinet.

Concerned with the arrangements for the peace conference, he was British representative on its secretariat. He was awarded £25,000 for his services in the war, and was clerk of the privy council, 1923-38. He became minister without portfolio in Chamberlain's war cabinet, 1939-40, was then chancellor of the duchy of Lancaster, paymaster-general, and from 1943 chairman of the colonial research products council. He was knighted in 1916 and created a peer in 1938.

**Han-Kiang.** Anglicisation of the Chinese for Han river. See Han.

**Hankow.** Old city and river port of China, forming with Yangyang, across the Han, and Wuchang, across the Yang-tse, the triple city of Wuhan, capital of Hupei prov. Hankow is on the left bank of the Yang-tse, 600 m. from the mouth, at the junction of the Han river. Founded during the Ming dynasty, it was left in ruins after the Taiping rebellion of 1853-60, but was opened in 1862 to foreign trade and remained a treaty port until the Second Great War. It is connected by rly. with Peking, 755 m. N.N.E., and is accessible in the summer to ocean-going steamers. The triple city forms the foremost trading centre in central China. Pop. of Wuhan (1956 est.) 1,800,000.

After the capture of Nanking by the Japanese in 1937, Hankow became the headquarters of Gen. Chiang Kai-shek and the provisional capital of China. Japanese troops entered the city on Oct. 25, 1938, but the government had retired to Chungking. Though bombed by Allied aircraft, Hankow remained in Japanese hands until Aug., 1945.

**Hanley.** District of Stoke-on-Trent, formerly a county borough and market town. It is 18 m. N. of



Hanley arms



Lord Hankey,  
British civil servant

Stafford and is served by railway. Hanley's chief buildings are the town hall, Victoria Hall, public library, school of art, and technical museum, as well

as a number of churches. There are three parks and two recreation grounds. The staple industry is the manufacture of pottery of all kinds from chinaware to tiles; there are also foundries and iron-works, while around are extensive coal mines. A modern place, Hanley developed with the growth of the pottery industry. It was made a borough in 1857, and in 1910 was included in Stoke-on-Trent. It had then a pop. of 66,000, being the most populous of the so-called Five Towns. Arnold Bennett was a native. See Potteries; Stoke-on-Trent.

**Hanna, MARCUS ALONZO** (1837-1904). American politician. Born at Lisbon, Ohio, Sept. 24, 1837, he worked in his father's grocery store at Cleveland after a brief schooling. Later he developed iron and coal industries on a large scale. In 1880 he organized a business men's movement on the Republican side. In 1896 he led the campaign for McKinley's nomination and subsequent election. From 1897 until his death he represented Ohio in the Senate, where his principal achievement was securing the acceptance of the Panama, as opposed to the Nicaragua, route for the canal. A shrewd political manager, he has been described as "the nearest thing to a national boss that ever emerged in this country." He died Feb. 15, 1904.

**Hannah.** Wife of Elkanah and mother of the prophet Samuel (1 Sam. 1, 2). Samuel was born in answer to prayer, and she dedicated him to God's service, taking him to Eli, the high priest, to become his attendant. Fairly common as a Christian name, Hannah in Hebrew means grace.

**Hannay, JAMES** (1827-73). A Scottish author. Born at Dumfries, Feb. 17, 1827, he served in the navy 1840-45. He then became a journalist, working for *The Morning Chronicle* and in 1860-64 as editor of *The Edinburgh Courant*. From 1868 he was British consul at Barcelona, where he died Jan. 3, 1873. Hannay's writings include novels, essays, and miscellaneous articles. *Satire and Satirists*, 1854, and *Characters and Criticisms*, 1865, show literary knowledge and taste. His novels include *Hearts are Trumps*, 1848; *Singleton Fontenoy*, 1850; *Eustace Conyers*, 1855. He also wrote studies on Thackeray, 1869.

**Hannay, JAMES OWEN.** Irish novelist, better known as George A. Birmingham (*q.v.*).

**Hannay, RICHARD.** An adventurous character and the narrator in a number of novels by John Buchan (Lord Tweedsmuir, *q.v.*). A modern Admirable Crichton, he first appeared in the trilogy: *The Thirty-Nine Steps* (1915), *Greenmantle* (1916), *Mr. Standfast* (1919). He also figured in *The Three Hostages* (1924), *John McNab* (1925), *The Dancing Floor* (1926), *The Runagates Club* (1928), and *The Island of Sheep* (1936).

**Hannen, JAMES HANNEN, BARON** (1821-94). British lawyer. Born in London, he was educated at S. Paul's and Heidelberg University, and was called to the bar at the Middle Temple, 1848. Appointed junior counsel to the treasury, 1863, he became a judge of the queen's bench, 1868, and judge of the probate and divorce court, 1872. He was president of the admiralty and divorce division, 1875 to 1891, when he was appointed a lord of appeal and created a life peer. In 1888 he presided over the Parnell commission, and in 1892 was an arbitrator in the dispute concerning the Bering Sea fisheries. Strong, dignified, learned, and accurate, Hannen ranks among the greatest English judges of the 19th century. He died March 29, 1894.

**Hannen, NICHOLAS JAMES** (b. 1881). British actor. Born in London, May 1, 1881, he was educated at Radley, Heidelberg, and Rouen. He studied architecture under Lutyens, but in 1910 went on the stage, in *The Girl in the Train*, playing for



Nicholas Hannen,  
British actor

four years in musical comedy. He made his first London success as Nelson in *The Dynasts*, and created a series of restrained, purposeful characters in such plays as *The Conquering Hero*, *Escape* (*q.v.*), *Many Waters*, *Accent on Youth*, *Winter Sunshine*, and *People of Our Class*. In 1944 he joined the Old Vic company, playing in *Shakespeare*, *Sheridan*, *Ibsen*, and *Shaw*. He was a leader of opposition to the regular opening of theatres on Sundays.

**Hannibal.** City of Missouri, U.S.A., in Marion co. It stands on the right bank of the Mississippi river, 120 m. N.W. of St. Louis, and is served by the Chicago, Burlington, and Quincy rly., an airport, and river steamers and barges. Across the Mississippi are two bridges, the Wabash (formerly Hannibal) completed 1871, and the Mark Twain, completed in 1933, the centenary of the birth of that writer, who passed his boyhood at Hannibal. The city abounds in memorials to him, including a lighthouse rising 200 ft. above the river, and a statue in the 200-acre Riverview Park, while his home is preserved. The world's first rly. mail car was produced here. Industrial plants include rly. shops, a large cement works, and factories making structural steel, precision tools, metal furniture, and shoes. Hannibal was founded in 1819, and received a city charter in 1845. Pop. (1950). 20,444.

**Hannibal** (c. 247-183 B.C.). Carthaginian soldier. He was the son of Hamilcar Barca, who, after the first Punic War (264-241 B.C.), in which Rome had wrested the command of the sea from her rival, organized what was virtually an independent Carthaginian dominion in Spain. In childhood Hannibal had taken a great oath to his father that his life should be devoted to the overthrow of Rome. In Spain the boy showed such extraordinary capacity that after Hamilcar's death the soldiery demanded his appointment to the supreme command. But Hannibal served under his brother-in-law Hasdrubal until the death of the latter in 221.

Two years later, by laying siege to the allied town of Saguntum, he roused Rome to declare war upon Carthage. He at once resolved upon an invasion of Italy. With extraordinary skill he led his army from Spain through S. Gaul in 218, defeated in the Rhône valley a Roman expedition sent to hold him in check, carried his army over the Alpine passes, as Napoleon did 2,000 years later, in the face of extraordinary difficulties, descended by the pass of Mont Genève into the Lombard plain, and routed the Roman armies at the battles of Ticinus and the



Hannibal, Carthaginian soldier  
From a bust found at Capua,  
now in Naples Museum

Trebbia. He led into Italy perhaps 20,000 men and 6,000 horse, also elephants which he used in battle.

Throughout the struggle Hannibal had to live upon the country, while he was entirely dependent upon his own military genius, the small and miscellaneous but devoted and admirably trained army, and such support as he could persuade or compel Rome's Italian enemies to supply. The Romans had the ascendancy by sea, so that he was in effect cut off from Spanish and African bases.

#### Carthaginian Victories

In the spring of 217 he pushed southwards, ambushed the great army of the Roman general Flaminius, and annihilated it at the battle of Lake Trasimenus. Failing to force a general engagement upon the new Roman commander Fabius Maximus (*q.v.*), he succeeded in passing by him and penetrating into S. Italy. There on Aug. 2, 216, he beguiled a third Roman commander with an army of 80,000 men into fighting a pitched battle at Cannae in Apulia. The finest force Rome had ever assembled was surrounded and almost annihilated, with the political effect of bringing over the S. Italians to Hannibal's side. The fact that he was still unable to besiege and capture Rome, but wintered at Capua instead of making the attempt, demonstrates the desperate character of his task.

From this time, while his ascendancy in the field was never broken, he was always struggling with diminishing resources against an inexhaustible adversary. Hannibal, like Frederick the Great in the Seven Years' War, might strike and strike again, but his blows could do no more than preserve his own army from destruction. At last, in 207, the Carthaginians threw another army under his brother Hasdrubal into N. Italy. Could he have effected a junction with Hannibal, the tide might have been turned; but while Hannibal was being contained in the S., the Roman general Nero, by a brilliant march, brought Hasdrubal's advancing army to action on the Metaurus and destroyed it. The battle was decisive. Hannibal remained on the defensive in the S., while the Romans crushed the Carthaginian power in Spain and in Sicily, and prepared a great expedition against Carthage itself.

Thither Hannibal was recalled in 203. But though he was placed in command, he was not, as in Italy, in effective control of

veteran troops who knew and trusted him. The Carthaginian army was crushed by Scipio at Zama, 202, and in the following year Rome dictated terms of peace. Hannibal retired from Carthage, where he was made powerless by the jealousy of the oligarchical government, and withdrew to Asia Minor, whence he urged the enemies of Rome to make war upon her. In 183, finding that his protector Prusias could not resist the Roman demands for the surrender of his person, he took poison at Libyssa. So perished one who as a military genius stands beside Alexander the Great, Julius Caesar, Marlborough, and Napoleon. *See* Carthage; Rome.

A. D. Innes

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**Hannington, JAMES (1847-85).** English missionary bishop. Born at Hurstpierpoint, Sept. 3, 1847, he was educated at St. Mary Hall, Oxford. His first ministerial duties were discharged at Martinhoe, Devon, and S. George's, Hurstpierpoint. In 1882 the murder of two missionaries on the Victoria Nyanza induced him to offer his services to the Church Missionary Society. Soon after his arrival in Uganda he was prostrated with fever, and forced to return to England. In 1884 he was consecrated bishop of Eastern Equatorial Africa. He reached Mombasa in Jan., 1885, in July he started for Uganda, and when almost at his goal he was suddenly attacked by forces of King Mwanga. Imprisoned in a grass hut for eight days, he, with the men of his caravan, was murdered on Oct. 29, 1885. *Consult* Last Journals,



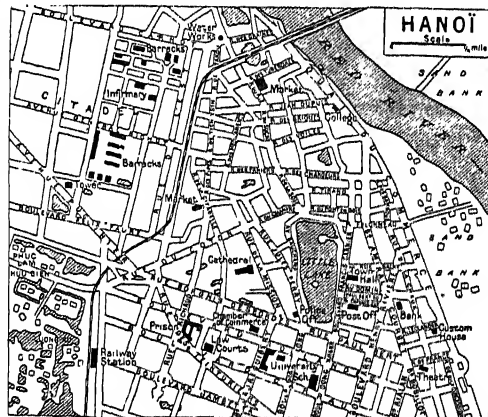
James Hannington, Missionary bishop

ed. E. C. Dawson, 1888; *Life*, C. D. Michael, 1928.

**Hanno.** Name of several eminent Carthaginians. Hanno the Great (*f.* 3rd century B.C.) was for 35 years the leader of the aristocratic party at Carthage which favoured peaceful relations with Rome, as opposed to Hamilcar Barca, Hannibal, and Hasdrubal, who advocated war. About 240 he was governor of Libya, where his oppression of the inhabitants caused them to revolt, in which they were supported by the Carthaginian mercenaries. Hanno was at first successful, but his inability to take advantage of his victory at Utica and his carelessness in withdrawing his forces led to a severe reverse, with the result that he was superseded by Hamilcar Barca, against whom he afterwards cherished a life-long enmity. After the battle of Zama he was one of the Carthaginian deputies sent to ask for peace.

Another Hanno was a navigator who lived about 500 B.C. Having passed the Straits of Gibraltar, he undertook a voyage of discovery along the west coast of Africa, the object of which was the increase of the commercial prosperity of Carthage and the foundation of colonies. He wrote an account of his voyage, originally in the Punic language, which has been preserved in a Greek version, entitled *The Periplus* (Eng. trans. Thomas Falconer, 1797).

**Hanoi.** Town of Vietnam, in North Vietnam (Tongking). The town stands on the right bank of the Song-ka or Red river, about 100 m. from its mouth in the China Sea. In 1902 it superseded Saigon as capital of Indo-China; from 1903 it was the seat of the governor-general of French Indo-China:



Hanoi. Plan showing the business quarter of this town of North Vietnam (Tongking)

made capital of Vietnam 1946, it was displaced as seat of government by Saigon, 1949.

The town occupies a large area. A fine rly. bridge, opened 1902, spans the river, and there are extensive remains of an ancient royal palace. The old native quarter lies between the citadel and the river. The houses are mainly of wood and mud, but after the coming of the French many handsome buildings arose: official premises, museum, hospital, theatre, and various hotels. A school of medicine for natives was opened in 1902, and together with a European college was formed into the university of Indo-China in 1917. The latter has faculties in arts, law, medicine, and pharmacy. The twin-towered cathedral is a prominent landmark. The citadel, which is perched on an eminence, is a square, 1,200 yds. to each side, surrounded by a brick wall, and contains many of the public buildings. In the vicinity is the Great Lake, on the shore of which is a Buddhist temple and a huge image of Buddha in bronze.

The city has electric tramways and a racecourse. An important centre of trade, mostly carried on by Europeans and Chinese, it has rly. connexion with Haiphong, the principal port, and with China. Manufactures include inlaid and lacquer ware, filigree work, mats, gold and silver wire, leather articles, and embroidery. Pop. (est. 1953) 298,000.

Hanoi was occupied by Japanese forces in Nov., 1941, by agreement with the Vichy government. When Chinese troops entered North Indo-China on Sept. 16, 1945, to receive the Japanese surrender, their headquarters were established at Hanoi. This occupation ended in April, 1946, under the terms of a Franco-Chinese treaty signed at Chungking, Feb. 28.

**Hanotaux, (ALBERT AUGUSTE) GABRIEL (1853-1944).** French historian and statesman. He was



Gabriel Hanotaux,  
French historian

born at Beauvevoir, Aisne, Nov. 19, 1853. An article by him in *La République Française* attracted Gambetta and secured him an appointment in the foreign office. In 1885 he held a position in the French legation in Constantinople. Deputy for Aisne, 1886-89, he became conspicuous by his opposition to Bou-



Hanoi, Vietnam. Air view of the central section of the "city between the waters," showing the Petit Lac in the foreground

langer. Having been director of the French foreign office, 1892, he was foreign minister 1894-95 and 1896-98. Hanotaux was a firm supporter of the policy that brought about the Franco-Russian alliance; but his anti-British policy in Africa led to the Fashoda incident of 1898. In 1897 he was elected to the Academy.

Hanotaux wrote a *History of the War of 1914*, which was published serially in many vols. His standard works are *Histoire de Richelieu*, 1893-1903, awarded the Gobert Prize by the Academy; *Histoire de la France Contemporaine*, 1903-08, Eng. trans. J. C. Tarver; *Histoire de la Troisième République*, 1904; *Histoire de la Nation Française*, 1920-24. In 1929 he published a study of Foch. He died April 11, 1944.

**Hanover** (Ger. Hannover). Former German province. Originally a principality, then an electorate, then a kingdom, Hanover became a province after its annexation by Prussia. Before it lost, 1816, the duchy of Lauenburg to Prussia, the kingdom of Hanover had an area of 14,733 sq. m.; on its annexation by Prussia in 1866, its area became 14,892 sq. m., owing to the incorporation in it of E. Friesland, the former bishopric of Hildesheim, etc. Its capital is the city of Hanover; its greatest extent E.-W. is 180 m., S.-N. 150 m.; it borders E. on the river Elbe, from Wittenberge to its mouth; N. on the North Sea—with the ports of Emden and Wilhelmshaven; W. on the Netherlands; S. on Westphalia, Greater Hesse, and Thuringia. Its pop. (1933) was 3,365,610, mostly of the Lower Saxon race;

82 p.c. are Protestant, 1 p.c. R.C. Its mostly flat and well-watered countryside has given rise to specialised agriculture; the breeding of fine horses and of the famous Frisian cattle, growing of wheat, rye, and barley, beekeeping and, especially in the Lüneburg heath area, mutton-grazing, are the main branches.

Coal, lead, silver, and salt mining are of some importance, and Germany's main petroleum wells are in Hanover. There are also several large iron works and machine and tool plants, and a considerable fishing industry, as well as shipbuilding and shipping.

The chequered history of the state begins with that of the sovereign principality of Calenberg, founded in 1495 after being a part first of Lüneburg, until 1409, then of Brunswick. The principality of Göttingen was joined to it in 1512, and in 1634 both fell to a younger branch of the Brunswick dynasty. In the meantime several counties had been added to it; in 1689 it acquired the duchy of Lauenburg, and in 1692, under Duke Ernest Augustus, husband of Sophia, daughter of the Elector Palatine and German "Winter King" Frederick V, and granddaughter of James I of England, an electorate was conferred upon the house, now called Hanover, though its family name was still Brunswick-Lüneburg. Under their son, George, the lands of the Celle sideline, and in 1714 the British crown, fell to the dynasty. As George I, this prince established a personal union. In 1715 he bought from Sweden, for Hanover, the duchies of Bremen and Verden; George II acquired further small-

ish areas, and under George III the Hanoverian state chancellery and other offices were transferred to London, Hanover being, in fact, ruled by the Hanoverian nobility. In 1737, under George II, the university of Göttingen was created and rapidly became a centre of historical and political research. Allied with Prussia, Hanover suffered heavily in the Seven Years' War, and was for a period under French occupation.

Fighting the French again, 1793-95; conquered, and for two years occupied, by Napoleon; given by him to Prussia in 1805 and taken back by him, 1807, partly embodied in his brother Jerome's kingdom of Westphalia, Hanover was liberated in 1813 and, enlarged, elevated to a kingdom by the Congress of Vienna. William IV, in 1831, dismissed the all-powerful Count Munster and appointed his brother Adolf Frederick, duke of Cambridge, governor-general.

#### Separation from Great Britain

With Victoria's accession, 1837, as the Hanoverian law did not allow female succession, the personal union ceased, and George III's fifth son, Ernest Augustus, duke of Cumberland, succeeded to the Hanoverian throne. He abolished the constitution granted in 1833, and thereby provoked the famous protest of seven professors of Göttingen (*q.v.*), and their exodus, in 1837, but had to moderate his regime during the 1848 revolution. His son, George V of Hanover, who succeeded in 1851, was blind; he also tried to turn back the clock and curtail the constitutional rights of the people. In the conflict between Prussia and Austria he backed the latter and, though his forces won a battle at Langensalza (June 27, 1866), was forced to capitulate, to abdicate, and to see his country annexed to Prussia by Bismarck.

The fortune of the royal house was confiscated and, under the name of Welfenfonds (=funds for the Guelphs), utilised by Bismarck for political bribery and propaganda; in 1892, however, it was transformed into a debt of the Prussian state, of £3 million, of which the interest was henceforth paid to the duke of Cumberland, claimant to the Hanoverian throne. The claim to independence from Prussia was kept alive by the Deutsch-Hannoversche Partei, or Guelph party, which held some 7 to 11 seats (of 379) in the Imperial parliament, and dwindled to only 4 or 5 under the Weimar Republic. A Guelph legion, of

implacable partisans of the Hanoverian dynasty, was formed in 1867; expelled by the Netherlands and Switzerland, it established itself in France, but was dissolved 1870. The Prusso-Hanoverian feud formally ended when, 1913, Prince Ernest Augustus, son and heir of the pretender, the duke of Cumberland, married Kaiser William II's only daughter and was made duke of Brunswick; one of his sons, in turn, was made an officer in the German army and, under the Nazi regime, endowed with the name of Prince George of Hanover.

In the Second Great War, the British 2nd army invaded Hanover in the first days of April, 1945, and advanced rapidly, reaching Lauenburg on the Elbe, April 19. At F.M. Montgomery's tactical headquarters on Lüneburg heath Gen.-Admiral von Friedeburg signed the unconditional surrender of all German naval, land, and air forces opposing 21st army group.

Hanover was in the British zone of occupation in Germany, achieving the status of a *Land* (state) Aug., 1946; two months later it was absorbed in the new *Land* of Lower Saxony, composed of Hanover, Oldenburg, and Brunswick.

#### Hanover (Ger. Hannover).

City of Lower Saxony, Germany, at the confluence of the Leine and Ihme, halfway between Berlin and the Rhine. Though an old town, first mentioned as Honovere (high river bank) in 1163, a city from 1203, and a ducal resi-



Hanover town arms

dence since 1636, Hanover is in the main a modern city. In its centre, however, it preserved a series of precious old buildings until the Second Great War, when no building of importance escaped damage from severe Allied air raids. It had gabled Gothic dwellings; the Knochenhauer, Leibnitz, and other houses; castle, market, S. Cross, and S. Giles churches dating back to the 13th and 14th centuries; the old town hall (15th century); several palaces; and fortifications. The main palace was built 1635-40, while that of Herrenhausen, N.W. of the city, built 1665, was famous for its park arranged on the Versailles pattern. A number of beautiful parks and gardens, mostly dating back to Electoral days, were one of Hanover's main characteristics. Modern buildings, among them a new town hall, an

opera house, the technical university, etc., made Hanover one of Germany's most impressive cities.

Hanover was the seat of finishing industry. It had iron- and steel-works, locomotive, bridge, and other engineering plants, Germany's greatest rubber combine (15,000 workers), machine and automobile factories, dye, paint, and ink factories, paper, velvet, and wool mills; made typewriters, gramophone records, tobacco, chocolate, cakes, meat preserves, etc. Some 25,000 separate enterprises gave work to nearly 200,000 workers.

A large river and canal port, with the largest lock in Europe close by, Hanover handled up to 400,000 tons of inland navigation. As a railway junction on the main E.-W. line between Berlin and Cologne, and the main N.-S. line between Hamburg and Bremen in the N. and Frankfurt and Munich in the S., and an airport with services to Russia, Denmark and Sweden, the Netherlands and Great Britain, Belgium and France, and Switzerland and Czechoslovakia, Hanover ranked in importance, though only 10th in order of population figures, with the greatest cities of Germany. Pop. (1955 est.), 519,600.

During the Second Great War, Hanover was captured on April 10, 1945, by infantry of the U.S. 9th army. Capital through centuries of the principality, electorate, kingdom, and province of Hanover, it became capital of the new *Land* (state) of Lower Saxony created in the British zone of occupation in Germany, Oct., 1946.

**Hanover Square.** A London square. It lies between the junctions of New Bond Street and Regent Street with Oxford Street. Laid out in 1718, and named in honour of George I, it has numbered among residents the book-collecting duke of Roxburgh, at Harewood House, built for him by the brothers Adam; General Lord Cadogan; the earl of Harewood, whose residence became the home of the Royal Agricultural Society; Lord High Chancellor Cowper; Lord Palmerston, father of the prime minister; Augusta, duchess of Brunswick; Mrs. Jordan the actress; Talleyrand; Lords Anson and Rodney; and Thomas Campbell as guest of the 2nd earl of Minto.

The square, for the most part rebuilt, is occupied by learned societies and business houses. The Oriental Club, founded 1824, is at No. 18. S. George's is off the square, in George Street.



